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SUGGESTIONS RELATING TO THE STUDY OF SOMATIC PAIN*

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It is my purpose in this paper briefly to outline certain aspects of pain from the standpoint of investigation, and to suggest the use, or the more extended use, of the experimental method of studying pain. I shall deal particularly with descriptions and identifications of different varieties of pain, and almost exclusively with that derived from somatic structures.

Preliminary Consideration of Some Gaps in our Knowledge

It has long been manifest that a history of pain—as it is related, with the full circumstances in which pain is felt, by an observant subject—may be itself diagnostic of a given disease or of disturbance of given tissue. I believe time will show this method to possess a longer reach than we have suspected; but before its full worth can be attained descriptions of pain must be made more accurate.

It must be obvious to anyone who has given thought to the matter that most descriptions of pains—as these are supplied to us by those who suffer from them in words purely of their own choice—fail to convey sufficiently precise ideas of the sensations experienced and therefore do not adequately identify them. One reason for inaccuracy and inadequacy of description is the difficulty of calling up exact memories of what has been felt some time previously. It is certain that the closer the description is to the event the more accurate it becomes, and that the description is most accurate when given at the time pain occurs and deliberately revised when it recurs. Another reason is the difficulty of finding right words of description and apposite illustrations; to do this requires a degree of observational and didactic skill, and of experience, which very few possess.

To be complete a description of pain experienced must at least comprise a statement of severity, of kind or quality, of relation to time, of locality, and of the circumstances in which it is felt. I shall attempt to deal with these separate aspects of pain neither exhaustively nor even equally, but only so far as will serve to make clear such relevant observations and ideas as I have to offer, and to bring different features into perspective.

SEVERITY

The general level of a pain's severity is recognized to be of clinical value; few pains, however, can be properly described as agonizing, and most of these are known to be derived from the viscera. It is widely believed that the intensity of pain in patients can be evaluated by those possessing intimate knowledge and sound judgment of human types and motives; but it is clear that in very many individual instances intensity cannot be gauged accurately either from the patient's account of it or from associated reactions. I am inclined to doubt if much, or even anything, would be gained by attempting to set up standards of pain severity with which spontaneous pain could be compared; and so I shall not speak further of the measurement of pain's intensity.

DURATION: TIME-INTENSITY CURVE

It is obvious that the diagnostic importance of a pain's duration rests on the time relation of the pain period and of its causal mechanism. This is well understood.

A feature of pain to which much too little attention has been given is what I may call the curve of pain intensity. It is of importance both because it is capable usually of accurate description and because it has a number of very significant associations. The curve portrays the manner in which pain starts, the rapidity of its culmination, the duration and smoothness at its height, and the manner of its decline. Pain may come and go in a flash, as when the skin of the face is pricked; it may rise to a plateau and last with little fluctuation for a long time before diminishing and vanishing, as when the skin has been burnt or in the attack of angina pectoris; it may be felt in rhythmic pulses, as in inflammation of dental pulp or in pulsating headache—an instance of more obscure derivation but one to which Pickering (1933) has made important and interesting contributions; it may be experienced as longer and less rhythmic phases, as in intestinal colic. All such variations must possess precise significances, related to the organ in which pain arises and to the manner of its origin. This is still largely an unexplored field, but a promising one for graphic record and other investigation.

LOCALIZATION

We know that the seat of origin of pain may be located by patients sometimes with precision, and that the general region from which it comes may be indicated clearly. The value of pain-localization as pointing to the seat of mischief is universally recognized; but accuracy in describing locality in which pain is felt begins to decline from the instant pain ceases. Localization should therefore be effected as far as possible while pain is felt; and it may be advantageous in the case of patients to test how closely the subject can localize appropriate pain when it is induced from a known region experimentally. There is another comment, and one which I think more important, that I would like to make in speaking of the localization of somatic pain. It is too generally assumed that somatic pain locates the seat of mischief. It locates the seat of mischief with great precision when this is the

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skin or an exposed mucous membrane; but there is much less evidence that it does so when deeper somatic structures, such as subcutaneous tissue, muscle, etc., are concerned. There are already a few well-recognized examples—for instance, the reference of pain from diaphragm to tip of shoulder or from hip-joint to knee—which illustrate how faulty the location of disease by pain may be. But my point is that such examples have come to be regarded as exceptional and that too little experimental work has been done on pain derived from these deeper structures.

QUALITY

One of the least-studied features of pain, and one to which I shall give more space, is its kind or quality. A direct description is no more possible than it is in the case of sense of colour: here we use the device of exemplification or association, as when we talk of "blood-red" or "orange"; and the frequent descriptions and comparisons of everyday life enable us to attain a high degree of accuracy in conveying by this method the idea of particular colours or tints. In describing the kind or quality of pain we are likewise restricted to exemplification, but in this connexion experience is infrequent and limited and the art of description is unpractised and unchecked. It is my view that experience may be supplied and practice obtained in the recognition of pains of different qualities and the naming of them. Common parlance has acquired a few striking terms, as when we speak of pain as "burning" or as "pricking," quite distinctly meaning to associate such pains with those provoked by burns or pricks. Here are two instances achieving unusual accuracy. But many terms in use and of like origin, such as tearing, boring, cutting, stabbing, and crushing, owing to the comparative infrequency of corresponding physical damages, convey as between two persons no exact ideas. The common device of describing pain in terms linking it with various forms of injury has little scientific and, apart from a very few examples, little practical value. This method of description has been almost sterile, because, as already indicated, experience of the relevant kinds of injury is uncommon and thus the terms cannot recall the appropriate sensations, and for other reasons. Thus it is obviously not clear that a constant type of pain is produced by an act of crushing or of tearing, and it is known that one kind of pain can follow both a crush and a burn. Another defect of current terminology is that it is often uncertain whether a term is used to convey an idea of the quality of pain or to illustrate the sequence of events as portrayed in the curve of pain intensity. The erroneous impressions which arise and are conveyed by the use of such terminology are indeed very numerous and serious, as will become clearer later in my attempt to analyse and define various types of pain. In illustrating and in leading up to certain suggestions and generalizations, I propose to consider pain, and especially the quality of pain, provoked from three somatic structures—namely, skin, muscle, and tendon (or web, etc.).

Skin Pain

When pain is derived from skin its localization is very accurate; it varies in intensity and in its duration, it may change from moment to moment, but it does not vary in quality or tone. Though this idea has been expressed by previous workers (Becher, 1915; Alrutz, 1909) and is summed up in the term "bright" pain ("hell Schmerz") of German writers, it is not apparent that it has been at all generally acknowledged. It is of so much importance if true that it deserves to be brought to the point of demonstration. Pain can be provoked by injuring the skin in a large number of different ways, as by pricking with a sharp point, by pinching tiny folds of skin, by pulling on hairs, by burning, by the passage of electrical current, and by the application of irritant poisons. The quality of pain evoked in these several ways from skin can in fact be demonstrated to be unvarying, in that when the tests are properly applied the subject is unable to decide the manner in which pain is produced. A fine wire is bent at an acute angle and heated electrically; the angle is brought into quite transient contact with the skin, or, alternatively, the skin is pricked by a needle. A blindfolded subject cannot detect which of these two forms of stimulation is employed (Lewis and Hess, 1933). Similarly, a quick tug upon a single hair or the make-and-break shock of a galvanic current may be used. All these will be described as pricking pain without distinction. Naturally it is necessary that the subject should not be allowed to receive associated sensory (but unpainful) stimuli that are peculiar to the form of stimulation. Thus if the contact of the hot wire is maintained unduly its warmth may be felt in addition to pain, and the form of stimulation will then be detected at once. When a hair is to be pulled it should first be isolated so that it may be grasped and pulled without warning, which simple contact with this or neighbouring hairs will give; and counter-pressure should be exerted around its base so that when the hair is pulled the skin is not lifted. Similar counter-pressure should be exerted when needle-prick, hot-wire contact, or galvanic shock is compared with this form of stimulation. The greater the precaution taken to eliminate supplementary sensory stimuli, or to reduce these to uniformity in comparing different forms of painful stimuli, the more successful will be the tests. The subject tested is soon aware that it is impossible to distinguish the different pain stimuli and that, where the form of stimulus is recognized, the recognition depends upon a non-painful accompanying sensation. The stimuli just discussed are all brief ones, and their effects are all called "pricking."

A prolonged stimulus gives rise to pain described as "burning"; and this is always so, whether the pain arises from heat or not. The bent wire is carried just through a small cork and thus applied to the skin, and enough current is now led through the wire to heat it; a needle point is sunk in a similar cork, and from it a galvanic current of appropriate strength is turned into the skin; an isolated hair is pulled and held tense through a small slit in a cork held around it and in contact with the skin; or a tiny fold of skin is caught up in sharp-edged forceps and pinched in similar circumstances: the subject cannot differentiate. All these forms of stimulus give rise to pain that is described without distinction as "burning" pain. It is recognized as such, not because of its peculiar quality, but because it is a cutaneous pain *that continues*; it is called "burning" from association. The hot stimulus applied briefly causes what is termed "pricking" pain; prolong the same stimulus and it is called "burning." The initial pull on a hair causes a "pricking" pain, but if the hair is held tense the quality of the pain, though quite unchanged, is now called "burning." The difference between "pricking" and "burning" pain is not one of quality or tone, it is purely one of duration.

So far pain arising from and ending with brief or short stimulation of the skin has been discussed; but pain may also continue as an after-effect of injury. The most widely recognized pain of this kind is that continuing long after contact with an object hot enough visibly to injure

the skin. Pain quite indistinguishable from this arises out of injuries resulting from continued friction, abrasions, crushes, freezing, ultra-violet burns, and irritant substances. And here it is important to note that it is identical in quality with, though it is usually less in intensity than, the pain previously discussed—namely, that which occurs during the actual period of stimulation. A series of minute scratches, closely set, gives rise after an interval of time to a very definite continuous pain; it has precisely the same qualities as the pain which follows a burn or which occurs after chloroform has been held on the skin. Comparison should be made of two forms of stimulation, applied symmetrically and simultaneously to two arms; the result is then convincing in the sense indicated. This and similar observations establish the fact that pain of only one *quality* can be provoked from skin. When we speak of "smarting," "burning," or "stinging" we are using terms that lack precise distinction. Some think it convenient to say that smarting is less intense than burning, others describe smarting and stinging as pain which begins with relative suddenness or does not continue long at full intensity. In the last instance the pain produced by the stings of insects or of plants clearly guides the definition. There are many variations in the curve of pain intensity, but there is no variation in the quality of pain originating in skin. The quality is the same however the pain is produced, whether from stimulation of nerve endings or of nerve fibres. While anaesthetizing by hypodermic injection a small cutaneous nerve, previously and accurately located, it is not very unusual for the needle point to touch the nerve; a burning pain is then felt in the area of the nerve's distribution which in quality is indistinguishable from that produced by injury of the skin itself.

Muscle Pain

The second example of pain I shall consider is that derived from muscle. Experiments in which pain is deliberately provoked from skin are easy to devise and to control. To test deeper-lying structures it has been necessary to use different methods. If the circulation to a limb is stopped and a group of muscles is exercised voluntarily, or if a single muscle is forced to contract by direct electrical stimulation, after a time pain is produced in the limb. This pain, as Pickering, Rothschild, and I (1931) proved, is derived from the muscle, and we put forward abundant evidence to show that it is due to a chemical or physico-chemical pain factor arising in muscular metabolism. This pain is disagreeable, it is rather diffuse and difficult to locate, it is continuous, and it is thought by most to waver a little in its intensity; its quality is indescribable, but the pain is distinctive. It is impossible to confuse pain from skin and pain from muscle.

When convinced that pain derived from skin has a constant quality or tone I turned to muscle and tested this to see if pain originating from it possessed similar constancy. I first used isotonic acid solution (a phosphoric acid and disodium hydrogen phosphate mixture of *p*H 5.0 to 6.5), injecting 0.3 c.cm. through a fine needle into a dorsal muscle of the forearm and comparing the resulting pain with that produced simultaneously in the symmetrical muscle by working this under ischaemic conditions. The two pains were indistinguishable. I subsequently used hypertonic solutions (4 to 5 per cent. sodium chloride), injecting a similar quantity of this, or alternatively of 0.5 per cent. potassium chloride with enough sodium chloride to render the solution isotonic; these injections also gave identical pain. Pain can be provoked mechanically by squeezing muscle firmly between finger and thumb; it can easily be elicited by light pressure over muscle that has been much used the day before. Similar pressure exerted upon the more superficial tissues is without effect; pain so induced is again found to be indistinguishable from that provoked by the same muscle by working it under ischaemic conditions. As an experimental method of producing muscle pain the injection of a minute quantity of a salt solution is the most satisfactory; it is very simple, harmless, and the stimulus is confined to a small mass of muscle. We have seen in the case of skin that pain, though it is of one kind, may be provoked for an instant or for indefinitely long periods. I have not succeeded in provoking very brief pain from muscle: once it appears in the field of consciousness it seems always to last at least a few seconds.

We have in this instance of muscle a second example of tissue from which pain of only one kind can be provoked: muscle pain, when it has been experienced often enough, can usually be recognized as such; it is pain most uniformly described as "aching" pain.

In these observations I have noted that muscle pain is referred to a distance. Thus pain arising from the lower part of the triceps is often referred down the inner side of the forearm to the little finger; from the trapezius it is usually referred to the occiput. I have been fortunate in interesting Dr. Kellgren in this matter. In a long series of very careful researches carried out in my laboratory he has formulated some very striking principles underlying the reference of pain from muscle—principles which appear to have an important practical bearing.

Web, Tendon, and Periosteal Pain

Thunberg (1902) distinguished a form of pain which he called "dull" pain ("dumpf Schmerz") and which was probably derived from subcutaneous tissues: as he points out, pain of this quality is readily produced by tightly squeezing the short web of skin between two adjacent fingers. The quality of two pains is a little less easy to compare if they are derived from unsymmetrical structures. Despite this fact I believe that pain derived from squeezing the web and from squeezing tendons, such as the tendo Achillis or that of the biceps flexor cruris, can be recognized to be of one quality. Here it may be said that pain from a tendon has exactly the same quality whether induced by pressure or by the injection into it of a small quantity of hypertonic salt solution or of buffered acid solution. In the same class as pain from tendon I would place also pain derived from the periosteum. In eliciting the latter I anaesthetize a little piece of skin over the tibia and carry a needle through this until it impinges on the bone. Each time the needle is jabbed against the tibia a disagreeable diffuse pain is produced which lasts at its height for an appreciable time. Similar pain is provoked but is longer-lasting if a small amount of hypertonic saline is injected while the needle point is against the bone. This pain, presumably arising from periosteum, is similar to if not indistinguishable from web and tendon pain. If a joint is strained in rough walking, pain is felt subsequently at each movement of the joint; it is an intermittent and rather short-lasting pain, but its quality is the same as that here described. When I have provoked pain from the periosteum it has been located with much accuracy. Head and Rivers (1908) found deep pain from pressure on the dorsum of the hand, when the skin had lost all sensation, to be accurately located. But reference sometimes occurs. Thus I have noticed that pain from saline injections confined to the subcutaneous tissue on the dorsum of the

hand may sometimes be referred to curiously distant points. Web pain is easily elicited by pressure upon a hand in which all touch and pressure sense has been lost during the ischaemia of arrested blood-flow; the web now pinched is usually, but not always, identified by the observer. These instances and those spoken of under muscle pain are sufficiently striking to make it clear that referred pains from somatic injury should be closely and systematically studied in the interests of accurate diagnosis. They can be investigated without difficulty by the experimental method, inducing pain in normal subjects from the relevant structures.

Application to Patients

In passing on to the application of experimental methods to patients suffering from spontaneous pains it should be made clear that I have not in mind at the moment an application to such patients as a routine in diagnosis, but rather to patients chosen because they are observant and because they are sufficiently interested in tests of the kind to give close attention and to co-operate in attempts to solve the mechanisms of pain.

Speaking of the tissues of the limb, there is none which cannot be reached and tested by the methods described. It would seem that they are responsible for pain of distinct qualities, here described as "skin," "muscle," and "web" pain, and probably representing all the forms of pain experienced from somatic structures. The pain derived from skin is always of the same quality; it is the most distinctive, and is produced from no structures of the limb other than skin and the nervous apparatus supplying it. If we consider somatic structures generally we must add that this pain is also derived from mucous membranes, but it is simpler to take the case of the limb. Once pain is properly identified as having this particular quality, which when experienced continuously is called in common parlance "burning," its origin from the structures named is certain; such pain is not derived from muscle or other deep-lying structure.

Pain that is clearly recognized to have a different quality comes from deep structures, and it may be recognized as derived from muscle, or alternatively from one of several tissues which give rise to web pain. The point I would first emphasize is that for purposes of investigation, and ultimately perhaps for diagnosis, the quality of pain derived from the limbs should not be described under such terms as "boring" and "stabbing," but only as "skin" and "muscle" pain. These are descriptive terms of quality which can be used by the experienced with accuracy, and convey essential information. The second point is that descriptions of pain taken from the inexperienced are inaccurate, just as descriptions of colour by a child are inaccurate: to obtain accuracy the subject must obtain experience. The power to distinguish between "skin" pain and "muscle" pain can be cultivated in all subjects without difficulty; the difference between them is conspicuous. Observant subjects can, I think, be brought to differentiate between "muscle" and "web" pain by repeatedly inducing pain from muscle and from other suitable structures and focusing attention upon it. If each of these three pains is distinctive of the tissue from which it is derived, then the origin of any such pain is recognizable as soon as the pain is appreciated. It is my view that the power to recognize pain arising from different types of tissue can be carried by repeated observation to a degree of accuracy which renders it a valuable asset in investigational work. Accuracy is more fully assured if, in investigating spontaneous pains, a pain recognized as identical in quality is produced experimentally in the same subject. It should be produced, if possible, in a symmetrical region and while the spontaneous pain is present. By inducing pain from skin, muscle, or tendon in an observant subject who suffers from spontaneous pain the origin of this pain in skin, muscle, or tendon may very probably be determined. The origin of headache from muscle or aponeurosis attached to the occiput can be determined by inducing such headache in quiescent periods by interferences with the corresponding structures.

I wish to emphasize the general principle that much exact information may be obtained in regard to spontaneous somatic pain by deliberate tests that provoke similar pain. It is clear that the quality of pain experienced may itself proclaim the type of tissue in which the pain arises. The locality in which pain is felt may likewise afford important evidence of the structure in which it is determined; but the evidence obtained from locality cannot be used safely where pains arising in deep structures are concerned, unless the reference of pain from such structures has been closely studied. Strong evidence that spontaneous pain comes from a given structure is presented when pain of the exact quality and distribution can be provoked from that structure. There are occasions when tests of pain can be carried a stage further.

Pain may sometimes be provoked in a normal limb—pain which not only is possessed of the appropriate quality and distribution but which presents the same time-intensity relations and is provoked under conditions suspected or known to exist in the case of the spontaneous pain being studied. I will cite two examples in illustration of this very complete type of observation. First, an area of skin on the dorsum of the foot is stated to be tender to light friction and to give continuous "burning" pain when the foot becomes warm or is hung down: a pain precisely similar in character and location, and provoked by the dependent posture and by warmth, follows the experimental procedure of burning the skin of the foot with ultra-violet rays (Lewis, 1933; Lewis and Hess, 1933). Second, a man suffers from what he describes as "cramp-like" pain in the calf of his left leg which comes on when he walks a hundred yards and continues when he rests; it is accompanied by tenderness on pressure over the calf. A pain identical in all these respects and associated with similar local tenderness can be provoked in the sound limb of this man on walking a hundred yards, provided that the circulation to his leg is first arrested (Lewis, Pickering, and Rothschild, 1931). These two examples illustrate the full application of the principle, for they not only display the discovery by the experimental method of the structures from which pain is derived but they throw a great deal of light upon the mechanism of syndromes which in these particular instances have been called "erythromelalgia" and "intermittent claudication," respectively.

It is my plea that the most informing statement concerning spontaneous pain is that it can be reproduced exactly by a closely defined experimental procedure, and that this method of studying pain by reproducing it is still far from exhausted. Its full worth, both in regard to accuracy and the extent to which it may be employed profitably to investigate pain in different circumstances, the future will disclose.

A Theoretical Consideration

In concluding that the quality of pain derived from skin or cutaneous nerve is constant and that pain of this quality is only so derived we are almost forced to infer that the

relevant pain impulses are connected ultimately to special receptors in the sensorium. Speaking of sensation generally, the nerve ending is specialized to receive particular forms of stimulus and to convert these into nerve impulses: there is reason to think that all these nerve impulses are fundamentally alike and that the nerves are mere conductors of a common pattern of excitation thrown into them by the end-apparatus. If this is indeed so, then the sensorium, which ultimately receives these impulses, alone determines the form of sensation, be it light, sound, or pain. The kind of pain which skin is capable of awakening is common to all parts of the skin and to the stratified mucous membranes: the corresponding nerves evidently belong to a common system and connect to a common centre.

We may for present purposes leave on one side the finer distinction between pain derived from muscle and that from other deep-lying structures, such as tendon, and deal only with pain from the skin and from deep-lying structures as a whole. The difference between the quality of skin pain and of deep pain is so clear, the quality of the former is so exclusive to skin and mucous membrane and of the latter to deep structures, that it is possible we are in error in classing both together under the one term "pain." It is a matter of usage: these two sensations have not been shown to possess the common properties which the use of a single term would imply, and I can see no conclusive reason for regarding them as more fundamentally akin than are other forms of sensation which are distinguished by separate terms. If we are right in concluding that the system of fibres subserving cutaneous pain passes to an appropriate and exclusive part of the sensorium which determines this particular sensation, we are brought to consider whether fibres subserving pain derived more deeply do not connect to a separate part of the sensorium.* At all events, we should bear in mind the possibly serious fallacy of regarding both types as represented in a common centre.

It is usual to-day to refer almost all peripheral sensations to the four specific systems—touch, pain, warmth, and cold—and there is a definite tendency to ascribe all other sensations, such as itch, tingling, and the various but different sensations classed together popularly as pain, to the touch or pain nerve system. This procedure is an arbitrary one, and has arisen out of a surrender to simplicity rather than from the dictates of evidence. It is conceivably the correct view, but it is not necessarily so, and we should be on guard. The difference in the quality of pain derived from skin and from deeper structures has led me to suppose that these may be fundamentally separate forms of sensation. The idea suggested that the two corresponding systems of peripheral nerves establish different connexions within the central nervous system is supported in other ways. Painful stimulation of the skin is well known to awaken quick protective reflexes. Painful stimulation of deeper structures does not appear to possess this association. Thus, stimulation of a decerebrate frog's toe results in instant withdrawal by flexion of the limb; so, too, will stimulation of any other part of the skin of the limb. But, if care is taken to avoid escape to cutaneous nerves, such reflexes do not seem to be obtainable from muscle or periosteum of the leg, or from abdominal viscus. While painful sensations derived from the human skin are associated with brisk movements, with rise of pulse rate, and with a sense of invigoration, those derived from deeper structures like periosteum and joints are often associated, as are for the most part those from the viscera, with quiescence, with slowing of the pulse, a fall of blood pressure, and nausea, the last phenomenon being responsible for the common designation "sickening" which is applied to this but never to cutaneous pain.

* Pain of both kinds is conveyed by the antero-lateral tract, as is shown by the abolition of both in cases in which this tract has been divided surgically.

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A PRELIMINARY ACCOUNT OF REFERRED PAINS ARISING FROM MUSCLE*

BY

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During the last year I have made an extensive investigation of the character and distribution of muscular pain produced experimentally in normal subjects. A detailed account of this work will appear in the next number of *Clinical Science*. Briefly I find that pain arising from muscle is always diffuse and is often referred, with a distribution which follows a spinal segmental pattern; and that this referred pain is associated with referred tenderness of the deep structures.

A number of cases of "fibrositis" or "myalgia" have been investigated from this point of view. The distribution of the pain was noted as accurately as possible, and experience of the distribution of pain provoked from normal muscles guided me to the muscles from which spontaneous pain might have arisen. Such muscles almost always presented tender spots on palpation. Pressure on these spots sometimes reproduced the patient's pain; but a method more often successful was the injection of sterile saline into the tender muscle. The injection of novocain may also reproduce the pain momentarily.

The search for the source of trouble by defining areas of tenderness is often confused by the patients calling attention to areas of referred tenderness. But referred tenderness is rarely conspicuous, and I have found it a useful guide to consider tenderness to be referred unless the patient winces under the palpation of a given spot. When these acutely tender spots were not too extensive they were infiltrated with 1 per cent. novocain, and the patients were then re-examined, more attention being paid to pain on movement and limitation of movement than to spontaneous pain. This infiltration often produced relief of the symptoms and signs, and sometimes abolished them completely.

In the eight illustrative cases here reported clear-cut results have been obtained in that the full spontaneous pain has been reproduced by manipulating the tender spots and all symptoms then abolished by anaesthetizing these spots locally; in these cases, therefore, it is sound to conclude that the widespread referred pain arose from the tender regions of the muscle. It has been found, too, that in instances in which novocain infiltration abolished the symptoms this effect often outlasted the actual anaesthesia and was more or less permanent. This suggests

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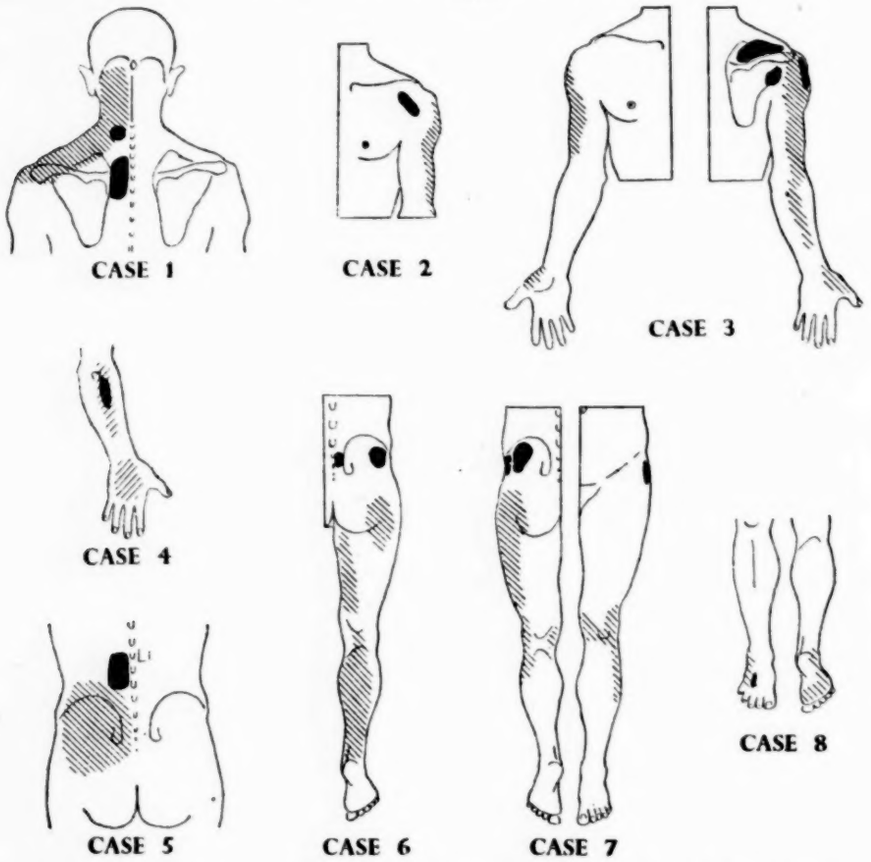
that novocain injection may be of therapeutic value in these cases, though the reason for its permanent effect is at present uncertain, and is under investigation.

The injection of local anaesthetics is of course a well-known therapeutic measure which has claimed occasional successes in these complaints, as indeed have most forms of local therapy. The uncertain results obtained with local therapy are not surprising when one considers that without an accurate knowledge of the distribution of muscular pains the therapy must often be applied to areas of referred pain and tenderness instead of to the source of the pain. It remains to be seen how much a further knowledge of muscular pain will help in the treatment of these very difficult cases.



Showing the distribution of pain (hatching) and tender spots (black) in eight cases in which the pain was abolished by anaesthetizing the tender spots with novocain.

Case I

A builder, aged 41, who had suffered for six months from pain in the left side of his neck. This came on gradually while he was doing overhead work to which he was unaccustomed. The pain was a continuous ache felt over the left side of the neck from the shoulder-tip to the occiput. The pain was aggravated by any use of the left arm; his neck felt stiff, and he had sudden exacerbations of pain on attempting to move his head. For the two weeks before he was seen the pain had been worse and had kept him awake at night.

He was a muscular man who appeared in fair general health. He held his head flexed to the right, and all neck movements were greatly limited by pain. He had a full range of passive movement in the left shoulder, but active movements were painful. Two tender spots were found—one in the erector spinae at the root of the neck, and the other by the vertebral border of the scapula (trapezius or rhomboids). The tender spots were infiltrated with 16 c.cm. novocain. This abolished the pain and he could move his head and neck painlessly through an almost normal range. One week later he was quite free from symptoms and had a full range of movement in the neck, though he had had some pain for two days after the injection.

Case II

A housewife, aged 35, who for two weeks had suffered from an aching pain felt down the outside of the left arm from the shoulder-tip to the elbow. The pain was continuous and aggravated by use of the arm, and she also had sudden stabs of pain when moving the abducted arm.

She was a stout woman who appeared in good general health. Her shoulder movements were full, except extension and internal rotation, which were limited by pain. A tender spot was found in the deltoid near its anterior border. This spot was infiltrated with 10 c.cm. novocain. During injection the pain in the arm was momentarily increased; then it was abolished, and at once internal rotation and extension of the shoulder became full and painless.

Case III

A housewife, aged 50, who for six months had suffered from pain in the right arm. This was of gradual onset and there was no history of trauma. Lately the right hand had felt weak and she had had some numbness and tingling of the fingers. The pain was a continuous ache felt from the shoulder-tip down the outside of the arm, the back of the forearm, and in the thumb.

She was a stout woman in good general health. All movements of the right shoulder were painful, and abduction and internal rotation were limited. The elbow, wrist, and hand joints appeared normal and there was no wasting and no sensory changes in the skin. A radiograph showed no bony abnormality in the shoulder or neck. Tender spots were found in the deltoid and supraspinatus and at the back of the shoulder over the latissimus dorsi or teres minor. These spots were infiltrated with 18 c.cm. novocain. There was a momentary increase of pain in the arm, forearm, or thumb during the injection of the different spots. When all the spots were anaesthetized the pain in the arm was abolished and the patient could move her shoulder painlessly through a full range. One week later there had been no return of pain in the arm, though it still felt heavy and weak.

Case IV

A police constable, aged 45, who had knocked his right elbow six weeks earlier, and since then had suffered from aching pain in the forearm and over the back of the hand.

He was a healthy muscular man. His elbow and wrist movements were full and painless, but gripping with the right hand was painful and weak. Extension of the fingers against resistance was also very painful. A tender spot was found in the belly of the extensor digitorum communis, and the tip of the external epicondyle was tender. The tender muscle was infiltrated with 5 c.cm. novocain. This abolished the pain, and his right grip was now strong and painless. One week later there had been no return of pain and his right grip was strong; the epicondyle was still tender.

Case V

A potato porter, aged 62, had suffered from lumbago on and off for forty years, but had been in more or less constant pain for the last year. Ten days previously he had had a great increase of pain, and since then this had been continuous; he obtained no relief in any position, and all movements were painful. The pain was felt over the left sacro-iliac joint and the left buttock.

This patient was an old but muscular man. He had great difficulty in moving because of pain, and he held his back quite rigid. Straight knee leg-raising: right to 65 degrees, left to 40 degrees, both limited by pain in left buttock. A tender place was found in the left erector spinae opposite the first, second, and third lumbar spines. This place was infiltrated with 30 c.cm. novocain. The pain was abolished; he could then move about painlessly and had fair mobility in his back. Straight knee leg-raising to 75 degrees on both sides. One week later he had had little pain since the injection and was free from pain except after prolonged sitting. Straight knee leg-raising to 80 degrees on both sides.

Case VI

A van driver, aged 33, had suffered for a year from aching pain in the right calf of gradual onset. For the last six months this had been getting worse, and had spread to the thigh and hip; it was a continuous ache, aggravated by walking or sitting down.

The patient was a thin man who appeared in good general health. In standing his weight was on his left leg, with his pelvis lower on the right side and with a lumbar scoliosis. He had a full and painless range of movement in the right hip, knee, and ankle, but there was some stiffness of the lumbo-sacral spine. Straight knee leg-raising to 80 degrees on left side and 40 degrees on right (limited by pain in leg). The right ankle-jerk was absent, but there were no sensory changes in the skin of the right leg.

Two tender spots were found—one in the right gluteus medius and the other in the right sacral erector spinae. Pressure on the sacral spot gave pain in the calf. The sacral tender spot was infiltrated with 40 c.cm. novocain. During the injection there was a momentary increase of pain in the calf. When this spot was anaesthetized the pain in the calf was abolished, but there was still some pain in the hip. Straight knee leg-raising to 75 degrees on right side, 80 degrees on left. The scoliosis was less obvious on standing. One week later he had been free from pain for two days, after which there had been some return of pain in the calf. The erector spinae was still tender, and the novocain infiltration was repeated. One month later he had had no pain in the calf since the second injection, but still had pain in the thigh and hip. He had no scoliosis on standing, but the right ankle-jerk was still absent.

Case VII

A baker of 36, who for seven months had suffered on and off from pain in both hips and legs. For the last week he had had a continuous aching pain in the left knee and in the outside of the left thigh and calf.

He was a muscular man who appeared in good general health and had a normal posture. He had limitation of abduction and rotation in both hips, but only the left was painful; there was full and painless movement in both knees and back. Straight knee leg-raising to 75 degrees on both sides. His knee- and ankle-jerks were present, and there were no sensory changes in the skin. Radiographs showed bilateral coxa vara, with very slight osteo-arthritic changes. Tender spots were found in the left gluteus medius and tensor fasciae femoris. These spots were infiltrated with 70 c.cm. novocain. During injection there was a momentary increase of pain in the knee. When the infiltration was complete the pain in the knee was abolished, but there was still slight pain in the hip. There was no change in the range of movement. One week later he had been free from pain for six days, though the night after the injection he had had much pain. The movements of both hips were still limited, though painless.

Case VIII

A clerk, aged 17, who had suffered from pain in his right foot for three weeks. This was not of sudden onset, and he had had no injury. The pain was felt under the metatarsal heads and in the outside of the foot and ankle. He had pain with each step and walked with a gross limp.

He appeared in good general health. His ankle and foot movements were full and only slightly painful. Radiographs showed no bony abnormality in the right foot. There was tenderness of the third interosseous space. The tender space was infiltrated with 3 c.cm. novocain. During the injection his pain was reproduced momentarily. Then it was abolished, and he could walk normally with complete comfort. Three weeks later he had been quite well except for two days following the injection, when he had had slight pain.

I am indebted to Dr. Bauwens of St. Thomas's Hospital, and to the casualty officers of University College Hospital, for allowing me to publish cases seen in their departments.

INTRADERMAL TEST FOR VITAMIN C DEFICIENCY

BY

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In a recent communication Rotter (1937) of Budapest suggested a skin test for the estimation of the vitamin C nutrition of the body. This test depended upon the fact that 2:6-dichlorphenolindophenol is decolorized by the tissues at a rate depending upon the ascorbic acid content. Rotter had noted that when small quantities of the dye were injected into the soles of guinea-pigs decolorization took place much more rapidly in healthy animals than in those with scurvy. He suggested that this disappearance of the dye was due to reduction by the ascorbic acid and not to resorption, since methylene-blue, simultaneously injected, remained unchanged. Similar results were obtained when a solution of the dye was administered intradermally to patients on vitamin-C-rich and vitamin-C-free diets. Rotter concluded from his experiments that the time for decolorization was an indication of the saturation or otherwise of the individual with regard to vitamin C. In "saturated" cases the dye disappeared in less than five minutes, in "normal" cases in five to ten minutes, and in "deficient" cases the dye took longer than ten minutes for decolorization.

The extreme simplicity of this method as a rough indication of the vitamin C content of the tissues is obvious and, if correct, would have considerable advantages over the present methods, which, although relatively simple, are not always convenient, require much more time, and may lay themselves open to errors if the technique is not carefully controlled. Accordingly, during the course of some other investigations, we have taken the opportunity of trying Rotter's skin test in convenient groups of cases.

Method

The method employed was that used by Dr. Rotter, who kindly supplied us with some further details. The requisites are a sterile solution of 2:6-dichlorphenolindophenol, a 1-c.cm. tuberculin syringe graduated in hundredths, and an intradermal needle.

Technique

The dye solution contains 2 mg. of the solid 2:6-dichlorphenolindophenol in 4.9 c.cm. of distilled water. This solution was found to be bacteriologically sterile. Nevertheless, since we have always sterilized our solution by passage through a Seitz filter, the pad of which was found to adsorb 20 to 30 per cent. of the dye, we have made up the solution as follows: the dye is dissolved in the proportion of 4 mg. to 4.9 c.cm. of distilled water; the sterile filtrate is standardized by removing an aliquot amount with a sterile pipette and titrating it against a freshly standardized solution of ascorbic acid (standardized against N/100 iodine solution). The filtrate is then diluted appropriately with sterile water to its correct strength (2 mg. in 4.9 c.cm.). This dye solution is freshly prepared every three to four weeks, since its strength begins to deteriorate after that time. Sterilization of the solution by autoclaving causes a 3 to 5 per cent. loss.

The site chosen for injection is the skin of the forearm in an area free from hair and small superficial veins, since the latter may cause confusion as they are the same colour as the dye. The skin is cleaned with ether and stretched, the needle is inserted intradermally, and 0.01 c.cm. of the solution injected immediately under the epithelium, a wheal 2 mm. in diameter being raised. The times of injection and of complete disappearance of the dye colour are noted. In order to minimize any error which may arise in the size of the wheal *four wheals* are raised and the average time for decolorization is taken in each patient.

Results

Tests have been made on a series of 103 patients who were under observation for other purposes, and seventeen of these were re-examined after complete saturation with ascorbic acid.

Group I.—This group consisted of thirty-five patients on whom (i) full and repeated ascorbic acid determinations had been made by the "saturation" test of Abbasy *et al.* (1935), and (ii) direct determinations of the ascorbic acid content of the blood according to Pijoan and Klemperer's modification of the method of Farmer and Abt (1935), or by blood tolerance tests, details of which will shortly be published.

TABLE I.—*Group I (35 Cases): Times Required for Complete Decolorization in Cases having had Full Vitamin C Determinations*

Before Treatment: Unsaturated	After Treatment: Complete Saturation	Partially Saturated
Blood Vitamin C: 0.27–0.52 mg./100 c.cm.	Blood Vitamin C: 1.32–2.0 mg./100 c.cm.	Blood Vitamin C: 0.72–1.3 mg./100 c.cm.
Mins.	Mins.	Mins.
29	2	13
28	5	11
28	3	10
25		10
22		9
22	2	9
21	3	8
21	2	7
20		7
19		6
17	2	5
16	4	4
16	6	4
16	1	3
11	1	
10	3	
9	1	
9	2	
9	1	
4	2	
3	0.5	
Mean 16.9	2.3	7.5

Group II.—This group comprised sixty-eight patients who did not have these full vitamin C tests but whose dietetic histories could be accurately assessed.

The patients in Group I were divided into three subgroups according to their degrees of vitamin C saturation as determined by the urinary vitamin C excretion test and by the ascorbic acid content of the blood. The normal blood ascorbic acid value as determined by Pijoan and Klemperer (1937) is 0.65 to 2 mg. per 100 c.cm.

In the unsaturated subgroup of patients before treatment the level of blood vitamin C was 0.27 to 0.52 mg. per 100 c.cm., and after complete saturation with ascorbic acid these patients when re-examined had blood ascorbic

acid values of 1.32 to 2 mg. per 100 c.cm. (Table I, column 2). It will be noted that in the twenty-one proved "unsaturated" patients (column 1) the dye was decolorized in 3 to 29 minutes (average 16.9), sixteen requiring 10 or more minutes. When entirely saturated these same patients showed complete decolorization of the dye in 0.5 to 6 minutes (average 2.3 minutes). By reference to the table it will be seen that the five unsaturated patients having decolorization times of 9, 9, 9, 4, and 3 minutes showed marked reduction to 1, 2, 1, 2, and 0.5 minutes respectively after saturation with ascorbic acid.

In the intermediate "partially saturated" subgroup (having blood ascorbic acid values of 0.72 to 1.3 mg. per 100 c.cm.) the times for decolorization slightly overlapped the other two subgroups, having a range of 3 to 13 (average 7.5 minutes)—two being longer than 10 minutes and five less than 7 minutes.

The second group (sixty-eight cases) has been examined from the dietetic point of view and correlated with the skin test; since full ascorbic acid determinations were not made these observations are not so useful as those obtained in the first group. Nevertheless the patients showed similar results (Table II). Thus:

TABLE II.—*Group II (68 Cases)*

(*a*) 18 Cases	(*b*) 37 Cases		(*c*) 13 Cases
7	16	8	33
6	14	8	22
5	14	8	21
4	14	8	21
4	12	8	19
4	11	7	19
3	11	7	18
3	11	7	11
3	11	7	11
3	11	7	11
3	10	7	10
3	10	7	10
3	10	6	4
2	10	6	
2	10	5	
2	9	5	
2	9	3	
2	9	3	
	8		
Mean 3.4	Mean 8.8		Mean 16.1

(*a*) In eighteen patients taking full mixed diets including large amounts of fresh fruit and vegetables daily the decolorization times were 2 to 7 minutes (average 3.4 minutes), and compare well with the corresponding results in Group I (0.5 to 6 minutes).

(*b*) Thirty-seven patients had been having fair diets—that is, ordinary diets without extra fruit, and apparently not deficient in vitamin C. These had decolorization times of 3 to 16 minutes (average 8.8 minutes).

(*c*) Thirteen patients had been on very deficient diets without any fresh fruit, vegetables, or vitamin-C-containing foods. These included scorbutic patients, and patients with gastric or duodenal ulcers taking strict diets without added ascorbic acid. Twelve of these patients had decolorization times between 10 and 33 minutes, and one gave a low decolorization time of 4 minutes; these times correspond very well with those obtained in the unsaturated patients of Group I, where the range was 3 to 29 minutes, with two low times of 4 and 3 minutes respectively.

With such a short series of cases it is difficult to reach definite conclusions, but it will be seen that a prolonged decolorization time (certainly greater than ten minutes) apparently parallels a deficiency of vitamin C. This does not necessarily mean that the skin test is a direct measure of the ascorbic acid content of the tissues, since other reducing substances, such as glutathione, will also cause a reduction of the dye. Nevertheless Rotter's skin test may furnish a useful rapid clinical test for vitamin C subnutrition, and is worth further study. The relation between the reduced ascorbic acid content of the blood and the skin decolorization time as determined by this method is shown in the diagram.

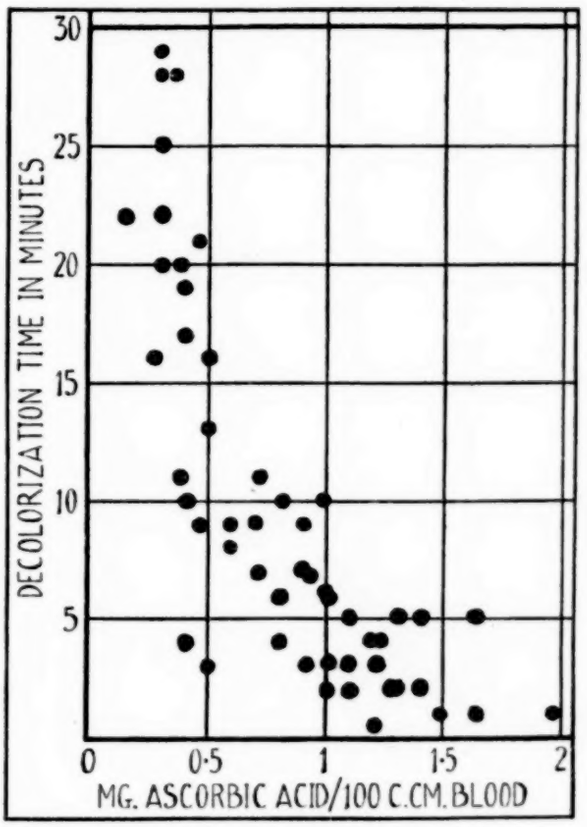

Diagram showing the correlation between the decolorization time and blood ascorbic acid.

Summary

A suggested intradermal test for vitamin C subnutrition using 2:6-dichlorphenolindophenol has been examined in a series of 103 patients.

Prolongation of the decolorization time appears to run parallel to the degree of vitamin C content of the tissues, although other reducing substances in the skin may be concerned in the decolorization phenomenon.

The method may be of value as a rapid clinical test for vitamin C deficiency. A decolorization time of less than five minutes indicates tissue saturation with vitamin C, while ten minutes or longer is in favour of a deficiency.

We wish to thank the honorary physicians of the Manchester Royal Infirmary for permission to use their cases and Roche Products Limited for the generous supplies of redoxon ascorbic acid. The work was carried out with the help of grants from the Medical Research Council and the Dickinson Research Scholarship Trust (B.P.).

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FRACTURE OF THE NECK OF THE FEMUR TREATED BY OBLIQUE OSTEOTOMY

BY

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No single surgical problem has received greater consideration during the past ten years than that of fracture of the neck of the femur. The difficulties met with in the treatment of fractures in this region were recognized by and mentioned in the writings of the earliest surgical authorities. To them the problem of obtaining bony union appeared to be insoluble, and their conclusions can best be summarized in the statement, "Fractures of the neck of the femur always result in non-union."

With the advance in the technique of radiography it was discovered that fractures of this part of the thigh-bone did not always occur at the same level, and that the prognosis as regards union depended on the site at which the line of fracture appeared. Thus, even with inadequate treatment, fractures of the base of the neck close to or impinging on the great trochanter almost invariably resulted in sound bony union, with or without deformity.

Fractures occurring nearer the head of the femur—the so-called transcervical or subcapital fractures—on the other hand, did not show this power of union, and as a result of the treatment, or rather want of treatment, which was common at that time non-union was to be expected in every instance. This attitude of defeatism and submission to the apparently inevitable was practically universal until the writings of Royal Whitman stimulated interest in the subject, and indicated that the problem, although difficult, was far from insoluble. By his work he proved that the uniformly bad results previously obtained were inevitable, as the popular treatment by sandbags and weights did not produce even approximate apposition of the broken surfaces, which is essential to the union of a fracture in any region. He also showed that these broken surfaces could be brought together by manipulation of the leg and hip, and that when this reduction of the displacement had been completed bony union was to be expected in a very large percentage of cases if fixation of the fractured surfaces was maintained for a sufficient period.

The Whitman Method

The technique of manipulative reduction as used by Whitman consisted in extension of the limb, followed by abduction to the fullest degree and complete internal rotation of the whole limb, after which he believed, on the evidence of a single *x*-ray photograph taken in the antero-posterior plane, that the fractured surfaces must be in apposition. The method of retention of the fractured surfaces consisted in the application of a plaster case extending from the thoracic wall to the toes of the affected side, the whole limb being fully abducted and internally rotated with the hip fixed in hyperextension.

Following his writings the treatment of the fracture was revolutionized, and the results were vastly improved, so that in the hands of a careful surgeon bony union was obtained in 50 per cent. to 60 per cent. of fractures, even of the transcervical type. Although this method was such a great advance on any previous form of treatment, it had several serious drawbacks. Probably the greatest of these was the unavoidable fixation of the limb in a most uncomfortable position of extreme abduction with hyper-extension at the hip-joint—a position preventing any attempt at sitting up and rendering the patient liable to the development of complications, of which the most serious was hypostatic pneumonia. The second great disadvantage of this method was the rigidity that so frequently followed prolonged fixation of joints in which some arthritic changes were probably already present. The third objection to the method was the very grave one that, even when carried out exactly according to the author's technique, non-union resulted in at least 40 per cent. of the cases.

The Smith-Petersen Operation

The next real step forward came from Smith-Petersen, who based his treatment on the belief that union of this fracture can only occur when, correct apposition of the fractured surfaces having been obtained, movement is prevented until union is complete. In order to obtain the necessary reduction and fixation he devised a method of treatment in which, by open operation, the fractured surfaces were brought into apposition and secured by means of a triradiate steel pin, which was inserted through the great trochanter, along the neck, and into the proximal fragment. This method, which has been modified in several details, has been used very extensively, and its enthusiastic disciples have claimed for it results far beyond those put forward by its originator.

The advantages of such a method are obvious. First, if the fragments can be securely held by such a pin, then fixation in plaster-of-Paris, with its great disadvantages, becomes unnecessary. Secondly, if the presence of a mass of metal does not counteract the advantages obtained by accurate apposition, then such a method, when correctly employed, should result in union in every instance. The method has, however, several disadvantages which may not be quite so obvious. Thus even in the most expert hands the operation is a serious one, involving considerable shock to the patient, and not always resulting in the placing of the pin in the desired position. If such a mishap should occur the operation may appear to be successful, but later, when walking is resumed, the small friable upper fragment cannot hold the pin, which cuts out through its upper border, leaving the patient more disabled than before. Another very serious drawback to the method, and one that has only recently been generally recognized, is the disintegration of the small proximal fragment which follows the operation in a certain percentage of patients in whom the pinning has apparently been successful.

This condition of disintegration—or, as it has been described, aseptic necrosis of the head of the femur occurring after apparently firm bony union—has been reported by Henderson to have taken place in 25 per cent. of his successful results. It is difficult to give an explanation of this complication, which may appear within a few months of the operation or at any time within the next two or three years. Probably it results from the presence of a large metallic mass, which causes a further diminution of the blood supply to an area of bone that is normally poorly nourished.

The results of the operation of pinning for fractures of the neck of the femur may therefore be summarized as follows. Disregarding the small percentage of patients who succumb to the operation on account of immediate or delayed shock, or from complications, bony union is to be expected in 70 per cent. to 80 per cent. of cases,

and of these apparent successes about one-quarter develop a disintegration of the head of the femur at any period up to four or five years following the operation.

Drawbacks of the Whitman and Smith-Petersen Methods

The advantages of these two methods are evident. By their use the end-results of treatment of this type of fracture have been greatly improved; but neither method is without risk, and their true value can only be appreciated by realizing their disadvantages, which in Whitman's method are: (1) the frequency with which non-union follows on even the most careful treatment; (2) the risks to these elderly patients which follow on prolonged fixation in the very uncomfortable position of abduction and hyperextension; (3) the rigidity of the joints which is caused by the fixation and twisting of the limb over a long period. The disadvantages of the insertion of a metal pin are: (1) the risks of failure to insert the pin in the ideal position, and the very definite risk of non-union; (2) the occurrence of fragmentation in the head of the femur following an apparently successful operation; (3) the very definite risk of infection in the hands of non-experts in the method.

Treatment by Oblique Osteotomy

With these considerations in mind it was natural that one should look for some method which would allow uninterrupted apposition of the fractured surfaces without the disadvantages that have been enumerated. In 1936 I published an article on the treatment of non-union following fractures of the neck of the femur by means of an oblique division of the shaft, which is cut through at the level of the lower border of the upper fragment. Following the osteotomy the shaft of the femur is displaced inwards to such a position that its upper end rests against the lower surface of the head of the femur and the cotyloid ligament of the acetabulum. Following the osteotomy and the displacement, fixation of the whole area is maintained for three and a half months in a plaster-of-Paris case extending from the lower ribs to the foot, with the thigh and legs in the neutral position. No tension is applied to any joint, the knee being kept slightly flexed with the foot at right angles, so that the danger of rigidity following the fixation disappears, or is at least greatly diminished. After the first eight weeks the portion of the case which encloses the ankle and foot may be removed in order that the patient can exercise and retain the muscle control.

In the article mentioned I gave the detailed end-results of twenty-seven cases of non-union of the neck of the femur which had been treated by this type of osteotomy, and showed that, so long as the operation was performed as described, a satisfactory result was to be expected in every instance. The essentials for success were summarized under the following three headings:

1. Correct position of the transferred shaft of the femur under the femoral head and lower border of the cotyloid ligament.

2. Fixation following operation for a period long enough to ensure union at the site of the osteotomy, without which the hip remains flail and very painful.

3. The fixation of the limb in the plaster case in the neutral position, or in very slight abduction, in order to prevent the development of a knock-knee deformity following the removal of plaster.

Recent Transcervical Fractures

Since the time of publication of that article the operation has met with such uniform success in the treatment of non-union that I have been encouraged to use it in the treatment of four recent transcervical fractures. The number of cases so treated is small, because I was anxious to study the final results and to discover any unsuspected complications that might follow on the use of this line of treatment in recent fractures. In each of these four cases all treatment has ceased for at least nine months, and it is therefore possible to reach a decision in regard to the value of the method. The results have been entirely satisfactory, firm bony union having occurred in each case at the original fracture and at the line of osteotomy. As a result of the operation the patients are all able to stand and walk without a limp, and with a hip-joint which is perfectly stable in every direction. In no case is there any trace of absorption or disintegration of the head of the femur—in fact, the application of pressure from the trochanteric fragment against the head of the femur has prevented even temporary "decalcification," which is so commonly seen. In one instance, in a patient in whom definite signs of creaking in the knee were already present, fixation in plaster led to a temporary stiffness of the joint, which responded to physiotherapy in three months. The only real disadvantages that I can find are a shortening of about one-half to three-quarters of an inch and a loss of the power of adduction of the thigh across the middle line of the body. The limb can be abducted fully, and adducted freely and easily to the middle line of the body, but the extreme normal adduction across the middle line is lost, a loss which is of no great importance.

Operative Technique

The details of the treatment are as follows. If shortening is already present when the patient is seen for the first time, full length of the limb should be restored by traction applied by means of adhesive strapping to the thigh and leg. Two or three days are quite sufficient to produce the necessary correction, and if there is at the same time a tendency to eversion of the limb this may also be corrected by the use of sandbags and by pressure on the outer side of the bent knee. When full length has been obtained the operation is carried out; an incision five inches in length is made along the outer border of the femoral shaft, extending downwards from the tip of the great trochanter. The muscles attached to this portion of the bone are completely raised from the anterior aspect, so that the lesser trochanter and lower border of the neck of the femur can be clearly seen. When the exact position of these different bony points has been decided an oblique osteotomy is made in the shaft of the femur,

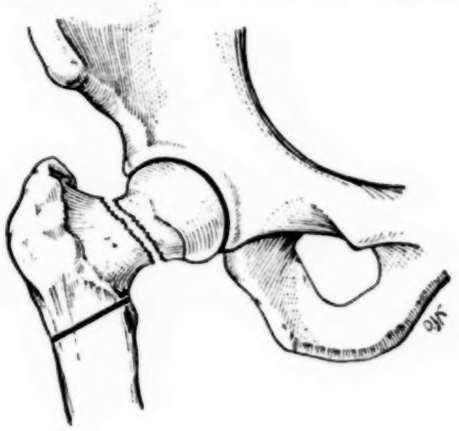

FIG. 1.—Fracture of the neck of the femur, showing line of osteotomy.

as in Fig. 1, its lower border on the outer margin being slightly below the level of the lower border of the lesser trochanter, while it terminates on the inner side between this bony prominence and the lower aspect of the neck. After completing the osteotomy the limb is rotated by grasping the knee and twisting the thigh inwards and outwards, so that there may be no locking between any bony projections on the cut surfaces, which might obstruct the inward displacement. The shaft of the femur is now displaced inwards, partly by abduction of the limb, which enables the two cut surfaces to slide on each other, and finally by digital pressure on the upper and outer aspect of the lower fragment so that there may be no doubt as to its complete inward displacement. This displacement constitutes the essential part in the operation. It must be complete, so that the upper end of the lower fragment lies directly under the head of the bone (Fig. 2).

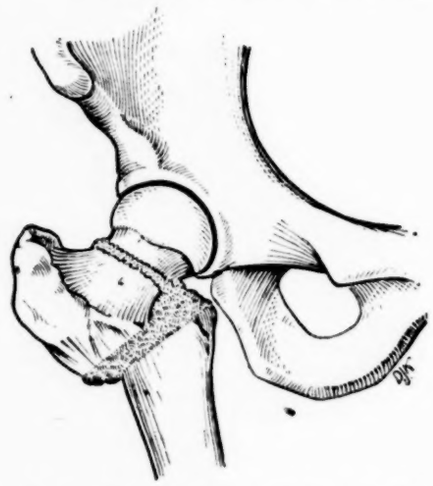

FIG. 2.—After displacement inwards of the shaft of the femur, showing the tilting of the head and of the trochanteric fragment.

If the surgeon is satisfied with any lesser displacement, then the essential point of the operation is lost, and the osteotomy will simply result in a pushing upwards of the trochanteric fragment.

The displacement being completed the position of full abduction may now be altered and the limb brought down to a position of not more than 20 degrees abduction. This alteration from the angle of full abduction is a most important step in the operation. If it is not carried out the presence of the femoral shaft in the abducted position prevents the rotation inwards of the upper fragment under the head of the femur—a position which is essential for the promotion of bony union in the original fracture, as shown in Fig. 2. After displacement of the shaft inwards the upper divided fragment, consisting of the great trochanter and base of the neck of the femur, must rotate inwards at its lower border on account of the common muscular attachments of the two fragments. Because of their close apposition the rotation of the trochanteric fragment produces a similar rotation of the head of the femur, so that the line of the cervical fracture, which was originally more or less vertical, is now almost transverse, and so long as this position is maintained muscular pull simply produces greater pressure between the broken surfaces. There is therefore a true coaptation of the broken surfaces in the original fracture, and this apposition cannot be altered because the shaft of the femur, lying in its new position, acts as a rigid strut.

No suturing, pinning, or wiring is necessary to retain the fragments in place, as the normal muscle tension keeps the shaft of the femur in its new position. Fixation is obtained by the application of a plaster spica, extending from the lower ribs to the middle of the foot, which is held in the neutral position, the hip- and knee-joints being kept in slight flexion. After three and a half months' fixation the plaster case is removed, and the patient is treated for two weeks by non-weight-bearing exercises, which help to restore the muscle power that has been diminished by the fixation in plaster. No splint or surgical apparatus is then necessary or advisable, and walking can be resumed with complete confidence, as this period of fixation is always sufficient to obtain firm bony union between the two divided fragments of the shaft of the femur.

The operation is a simple procedure, giving but little shock to the patient, and can be performed successfully by any competent surgeon without the help of repeated *x*-ray photographs or an elaborate team of assistants. It has one outstanding advantage over the other two methods: when failure results from treatment by pinning, or by Whitman's method of plaster fixation, the patient is left with an unstable weak hip, which must remain as a permanent disability or require some other extensive surgical procedure. If this operation by osteotomy does not succeed in producing a bony union at the original fracture in the neck of the femur it leaves a hip-joint that is perfectly stable, on which the patient can walk without discomfort and without pain, and with only one-half to three-quarters of an inch shortening. This point, of course, is of the very greatest importance, because these elderly patients should not be subjected to operations of which the results are doubtful, and the essential feature of this method is that the whole treatment is restricted to one surgical procedure.

The after-treatment by fixation in plaster might be considered as being open to the same objections as those of Whitman's method, and as one likely to be followed by troublesome rigidity, especially of the knee-joint; but this objection does not hold, as in this case there is no torsion of the limb and consequently no continued strain on the joint, which lies comfortably in slight flexion in its plaster case. In addition the avoidance of the position of hyperextension at the hip-joint is of the greatest help in diminishing the shock and the possibility of post-operative complications.

Illustrative Cases

The details of the cases treated are as follows.

Case 1.—A man aged 38 sustained a transcervical fracture of the femur, which was treated by rest in bed for five weeks. On examination there was half an inch shortening with considerable eversion of the limb. The position was corrected in four days by a weight extension, and after confirming it by radiographs an oblique osteotomy was performed. After three and a half months' fixation the plaster case was removed, when fresh radiographs showed that bony union had occurred between all three fragments of the femur. The man can now walk five miles without any discomfort, and can ride a bicycle and swim with ease.

Case 2.—A man aged 45 who suffered from complete paralysis of both legs following an attack of infantile paralysis at 20 years of age. He had been able, with the use of crutches, to get about his garden and to work there, and the *x*-ray photographs showed that all the bones of his lower limbs were smaller and thinner than normal. Following a transcervical fracture two days previously there was three-quarters of an inch shortening of the affected leg, with some eversion. Full length and position were readily obtained by gentle pull, and the osteotomy was completed as described. The patient can now do all he could before his accident;

union is firm, and the shortening is slightly less than half an inch.

Case 3.—A woman aged 55 had a transcervical fracture of the neck of the femur. She was operated on three days later by oblique osteotomy and fixed in plaster for three and a half months. She is now walking well without pain and with perfect stability. There is good union of all three fragments.

Case 4.—A woman aged 54 sustained a transcervical fracture of the neck of the femur. She was operated on six days later by oblique osteotomy. After three and a half months' fixation in plaster union was complete in all three fragments. The patient is now apparently normal, without disability or pain, although there was temporary stiffness in the knee-joint for three months. This was cured by massage and voluntary movements, and did not prevent the patient from walking at any time.

A POSSIBLE DISCREPANCY IN THE ESTIMATION OF ASCORBIC ACID IN URINE

BY

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Tests have recently been evolved for the estimation of ascorbic acid in urine, and these have been used for the diagnosis of latent and subclinical scurvy. The main difficulty in their clinical application lies in the collection of specimens of urine passed during the night and early morning, since it is recognized that ascorbic acid is rapidly oxidized on standing, even when kept in dark tightly stoppered bottles; and because ascorbic acid is not excreted at a uniform rate a twenty-four-hours test at least is essential. It has been shown by Borsook *et al.* (1937) that in an alkaline medium ascorbic acid can be oxidized into dehydroascorbic and, further still, into 2:3-diketo-*l*-gulonic acid; but this latter reaction is not reversible, so that the passage of H_2S through the solution, although it converts the dehydroascorbic acid back to ascorbic acid, does not touch the diketogulonic acid, which is lost. The irreversible change from dehydroascorbic acid begins at a *p*H of about 4 and increases as the *p*H rises. In order to overcome this difficulty preservatives have been added to the urine in the form of acetic acid and sulphuric acid.

Although some workers appear to be aware of the destruction of ascorbic acid by sulphuric acid, it has seemed worth while to us to publish this paper. Youmans *et al.* (1936) used 10 per cent. 2N sulphuric acid as a preservative, and Mack and Tressler (1937) mention using 5 per cent. sulphuric acid for the inhibition of the oxidase present in vegetable juices.

The Relative Efficiency of Acetic and Sulphuric Acids

Before proceeding with the clinical application of these tests it occurred to us to examine the relative efficiency of these two acids. The micro-method of Birch *et al.* (1933) was used, with the exception of a teat pipette in place of a micro-burette. For this purpose specimens of fresh urine were employed, samples of each being tested by both methods, the urine being kept in dark bottles throughout the experiment. Control experiments with the same specimens of urine to which nothing was added were carried out simultaneously. It was found that at the end of twenty-four hours the readings of the two tests corresponded closely with a loss of 15 per cent. to 21 per cent. of the reducing substance, the controls showing 26 per cent. to 31 per cent. loss. At the end of forty-eight hours the loss with sulphuric acid only increased by 2 per cent. or 3 per cent.; the loss with acetic acid rose to about 50 per cent., while the loss with untreated urine varied from 80 per cent. to 100 per cent.

With a view to still further checking these results the tests were repeated, but using solutions of ascorbic acid in water instead of urine, the concentration of ascorbic acid being kept similar to that usually found in urines so far tested. These tests showed that during the first five minutes the loss with solutions of 1 per cent. sulphuric acid was 20 per cent., with acetic acid 5 per cent., and with water 15 per cent. (In dealing with the aqueous solutions the acid necessary for the test was added at the moment of titration.) After twenty-four hours the loss with acetic acid varied from 27 per cent. to 36 per cent., while that occurring with sulphuric acid and unacidified solutions was in every case 100 per cent. Tests with sulphuric acid in higher concentrations up to 20 per cent. gave a correspondingly greater loss of ascorbic acid in the same time.

From these results it is clear that sulphuric acid tends to destroy rather than preserve ascorbic acid in aqueous solutions.

Reasons for Apparent Difference in Action

To account for the apparent difference in the action of sulphuric acid on ascorbic acid in aqueous solutions and those containing urine it was necessary to postulate one of three possibilities: (i) there was some reducing substance in the urine apart from ascorbic acid which was preserved by sulphuric acid; (ii) the urine in conjunction with sulphuric acid had a preservative action on ascorbic acid; (iii) the substance tested for was not ascorbic acid. In order to elucidate this problem two other tests were performed.

1. A known quantity of ascorbic acid was added to fresh urine in which the amount of reducing substance had been previously estimated, and the above tests were repeated on the resulting solutions.

2. Urine was allowed to stand until tests for the reducing substance were negative. To this were added known quantities of ascorbic acid, and the above tests again repeated, using samples of the same specimens of urine for each; in each case controls with the same amount of ascorbic acid in water, 1 per cent. sulphuric acid, and 5 per cent. acetic acid were carried out.

From these experiments the following results emerged:

In the experiment with urine containing a measured quantity of titrable substance the loss during the first five minutes with unacidified solutions and those acidified with 5 per cent. acetic acid was never more than 3 per cent., and the former always exceeded the latter by at least 1 per cent.

In the case of the solution acidified with 1 per cent. sulphuric acid the loss varied from 12 per cent. to 19 per cent., so that there appears to be an immediate destruction of ascorbic acid on the addition of sulphuric acid, the readings being only slightly lower than those obtained with ascorbic acid in water acidified with 1 per cent. sulphuric acid.

It was next found that during the following twenty-four hours the loss of titrable substance proceeded more slowly in sulphuric acid solutions than in aqueous solutions (28 per cent. compared with 45 per cent.) and only slightly more rapidly than in the case of acetic acid, which gave about 22 per cent. loss in the twenty-four hours subsequent to the first five minutes.

In the tests in which ascorbic acid was added to urine kept until all titrable substance had disappeared the results followed very closely those obtained with ascorbic acid in solution in water, sulphuric acid, and acetic acid.

These results would appear to throw doubt not only on the efficiency of sulphuric acid as a preservative for ascorbic acid but also on the nature of the reducing substance in the urine as measured by these tests. In any case an explanation is obviously required to account for the fact that ascorbic acid in the presence of urine and sulphuric acid is destroyed, while the reducing substance in urine, as measured by these tests and presumed to be ascorbic acid, is preserved by sulphuric acid of the same strength. Incidentally it may be pointed out that the loss of reducing substance in lemon juice when kept for twenty-four hours in 1 per cent. sulphuric acid is 100 per cent.

Table showing Loss of Reducing Substance in Tests with Sulphuric and Acetic Acids

	Loss of Reducing Substance	
	First Five Minutes	Subsequent 24 Hours
	%	%
Ascorbic acid in water	10	100
„ „ 1% sulphuric acid	20	100
„ „ 5% acetic acid	5	29
Reducing substance in urine		31
„ „ „ +1% sulphuric acid ..		16
„ „ „ +5% acetic acid ..		19
Ascorbic acid and tested urine	2	45
„ „ „ „ +sulphuric acid ..	16	28
„ „ „ „ +acetic acid	1	22
Ascorbic acid and non-reducing urine		100
„ „ „ „ +sulphuric acid		89
„ „ „ „ +acetic acid ..		31

A Possible Difficulty due to Catalysis

It was suggested to us that a possible difficulty in this work is due to catalysis of the oxidation of ascorbic acid by traces of copper present either (*a*) in ordinary distilled water or (*b*) in the sulphuric acid. Stotz *et al.* (1937) also state that the sensitivity of ascorbic acid to aerobic oxidation when copper is present as a catalyst is perhaps its most striking characteristic *in vitro*. Lyman, Schultze, and King (1937) point out that the instability of ascorbic acid in weakly acid solutions is due to the copper content of the solution, and that by its strict elimination ascorbic acid solutions are stable below a *p*H of 7.6. These authors used metaphosphoric acid, which inhibits the copper-catalysed oxidation of ascorbic acid by decreasing the amount of copper effective in the catalysis.

However, if the copper is present in the sulphuric acid the question still remains as to why there is a difference in the rate of destruction of the reducing substance in fresh urine in the presence of sulphuric acid (? + copper) and the rate of destruction of ascorbic acid which has been added to fresh urine in the presence of the same reagent. It also fails to account for the fact that there is an *immediate* (five minutes) loss of ascorbic acid *in fresh urine* with sulphuric acid (? + copper) of about 16 per cent., while the loss in the same time with acetic acid is only 1 per cent. (The catalysis should be inhibited by fresh urine.) The only distilled water employed in these two tests is that used to dissolve the dye, and this would be present equally in all these tests. With regard to the occurrence of copper in the distilled water used in the other tests, if it is present it would appear to make the test unreliable for clinical purposes—at any rate, where sulphuric acid is used.

Van Eekelen (1936) has pointed out that ergothioneine and thiosulphates both reduce 2:6-dichlorophenolindophenol and that these substances must be removed by precipitation with mercuric acetate. In view of the fact that even with acetic acid there is a destruction of ascorbic acid on keeping, it is quite obvious that the results obtained will be of very doubtful value, unless the titration is carried out immediately after voiding. Although to do this may appear clinically tedious, it is scientifically sound, for examination of twenty-four hours' urine is necessary.

Summary

Sulphuric acid, which was still being used to "preserve" ascorbic acid in twenty-four-hour specimens of urine at the time of writing, has been shown to destroy ascorbic acid even when used in a concentration of 1 per cent.; with stronger solutions the destructive effect is greater still.

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TREATMENT OF INFANTILE PYLORIC STENOSIS BY ANTISPASMODICS

BY

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The majority of observers regard infantile pyloric stenosis as essentially a disorder of the neuro-muscular apparatus of the gastric outlet, rather than as the result of a hypertrophy of the pyloric muscle of unknown origin. It might have been expected, therefore, that this condition would respond well to medical treatment, but until recently experience has shown that this is not the case. Parsons (1933) states that only 20 per cent. of patients recover if treated medically, whereas a recovery rate of 80 per cent. can be anticipated if Rammstedt's operation is performed. Thompson and Gaisford (1935) in a review of 209 surgical cases find that the death rate was 14.4 per cent. Recently, it is true, Harris and Keynes (1937) have reported thirty-six cases treated surgically with only one fatality (2.8 per cent.), but these figures are exceptional in this country. As a rule surgical treatment may be expected to cure four patients out of five with this complaint, while with the older methods of medical treatment the majority of cases ended fatally.

Treatment by Eumydrine

In December, 1935, Svensgaard published the results of treating congenital pyloric stenosis with eumydrine, or atropine methyl nitrate. Only two of sixty-one patients died, giving the remarkably low mortality rate of 3.3 per cent. (or 1.6 per cent. if one death attributed to pyelonephritis is omitted). In this connexion, however, it must be remembered that foreign statistics are invariably better

than British, possibly because in this country a greater distinction is drawn between pyloric stenosis and pyloric spasm, with the result that only the more severe cases are included in any given series.

As soon as Svensgaard's paper was published treatment by eumydrine was started in the Children's Hospital of the Leicester Royal Infirmary, and has since been adopted as the routine treatment. Although the results have not been as brilliant as Svensgaard's, they compare favourably with those of surgical treatment, and there is reason to believe that they will become progressively better. Svensgaard's routine has been closely followed in this series—that is to say, the patients are given subcutaneous saline until diuresis demonstrates that dehydration has been overcome, then 5 c.cm. of a freshly prepared 1 in 10,000 aqueous solution (0.5 mg.) of eumydrine is administered orally half an hour before feeding. The children are breast-fed if possible; for the bottle-fed half-cream dried milk is used. Twenty-one babies have received this treatment. Three were nursed in a private hospital and eighteen in the Children's Hospital. (One baby who was admitted with pyloric stenosis during this period is not included in this series. He was premature, bottle-fed, and febrile. Eumydrine was tried for a few days, and although there was some improvement in regard to the vomiting the child was so ill that it was thought that surgical measures would give him the best chance, Rammstedt's operation therefore being performed. The child died from respiratory infection soon after.)

The three patients in the private hospital all recovered. Of the eighteen in the Children's Hospital three died, and in three eumydrine was apparently ineffective: two of these last were cured surgically, and one by means of syntropan (see below). The total mortality, therefore, was three out of twenty-one patients, or 14.3 per cent. Surgical statistics for the four previous years show a mortality of 23 per cent., ranging from no deaths in eight cases in 1933 to five deaths in twelve cases in 1932.

Of the deaths two occurred from secondary infection (pneumonia) after the pyloric stenosis had apparently been cured. In one of these cases arrangements had actually been made to discharge the patient, when he developed his fatal infection. Since the occurrence of these deaths each child has been nursed in a cubicle, and from that time secondary infection has been unknown in the eumydrine series. The other child died suddenly while taking a breast-feed. This may have been due to alkalosis, and now each patient receives 2 grains of ammonium chloride thrice daily while the vomiting continues.

Seventeen of these twenty-one babies were bottle-fed, so that a high mortality rate was to be expected: the figure of 14.3 per cent. cannot therefore be regarded as unsatisfactory, particularly when the individual fatalities are considered. The average duration of treatment was five and a half weeks, the shortest being two and a half weeks and the longest twelve weeks. Both the last-mentioned were private cases; the one which lasted twelve weeks developed merycism, which greatly prolonged his stay in hospital.

Treatment by Syntropan

As considerable success was experienced from the treatment of infantile pyloric stenosis by eumydrine, or atropine methyl nitrate, it was thought possible that equally good or even better results might follow the use of syntropan, the acid phosphate of dimethyl-dimethylaminopropanol ester of tropic acid, since that compound was stated to be effective in the treatment of sea-sickness. The first baby to be treated by this drug was one in which eumydrine had apparently failed. After a month's treatment he had not gained weight and was still vomiting. He was then given 10 mg. of syntropan suspended in 2 c.cm. of water orally before each feed. Vomiting practically stopped immediately, but there was a little regurgitation for three weeks, during which time he gained over a pound in weight. He was discharged cured a month after the beginning of treatment by syntropan.

The hopes of success anticipated from this case, however, have not been realized in two subsequent patients. One of these, although the vomiting diminished and the bowels became more regular, developed pneumonia and died six days after admission, in spite of being nursed under conditions of isolation; the other did not respond to syntropan, and after four days of vomiting was treated by eumydrine. This apparently relieved the pyloric stenosis, and he lost all his symptoms and began to gain weight rapidly. Suddenly, however, he developed a temperature of 103° F. and died in a few hours from lobar pneumonia.

Conclusion

The standard of diagnosis adopted was radiological. Although in the great majority of cases visible peristalsis, projectile vomiting, and a palpable pyloric tumour formed a diagnostic triad, in a few cases the pyloric tumour was not felt. At first only these cases were radiographed, but later all were examined radiologically as a routine, as this presents the best method of differentiating pyloric stenosis from pyloric spasm and eliminates any personal factor. I do not myself consider this necessary, since it seems illogical to make two diseases of two conditions of identical age incidence and symptomatology, which are cured by the identical treatment, and which are differentiated only by one physical sign. But in view of the fetish made of the palpable pyloric tumour by many clinicians, radiological diagnosis was considered desirable for the purpose of recording cases.

The efficacy of eumydrine in the treatment of pyloric stenosis has been confirmed, and in the few cases in which it is not successful it is possible that treatment with some other tropic acid derivative such as syntropan will succeed. Further observations are being carried out regarding the place of this and other drugs in the treatment of the condition. Already, however, it is apparent that the problem in the medical treatment of infantile pyloric stenosis is not so much the failure of the antispasmodic as the liability of the patient to secondary infection.

Acknowledgments are due to Messrs. Bayers and to Roche Products Ltd. for the supply of eumydrine and syntropan respectively.

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In the December number of *Colorado Medicine* H. J. Corper pays a graceful tribute to the Viennese pathologist Anton Ghon (1866–1936), who twenty-five years ago described what has since been called the "Ghon tubercle." This periodical, beginning with the January, 1938, issue, has changed its title to *Rocky Mountain Medical Journal*, and at the same time has become the official journal of the Utah State Medical Association.

Clinical Memoranda

Extra-uterine Pregnancy with Several Months' Retention of Dead Foetus

A case of what appeared to be a full-term ovarian pregnancy is here reported.

CASE RECORD

On April 27, 1937, the patient, a mestiza or half-caste, was admitted to the Urco Mission Clinic suffering from a large abdominal swelling and complaining of general ill-health. Abdominal and vaginal examination showed the presence of a hard globular slightly movable tumour arising in the pelvis, corresponding in size to that of a full-term uterus, but independent of the uterus, which was of normal dimensions and pushed to the right. The cervix was hard and easily reached.

The patient was a widow aged 30, having lost her husband in April of the previous year, and she worked as a cook. Menstruation began when 12 years of age: cycle 3/28, with normal loss. A 3-para, her first pregnancy ended in the seventh month, the second and third normally at full term. Her youngest child was 3 years of age. There were no abortions. In January, 1936, she had a normal period, beginning on the 8th. In February she menstruated from the 1st to the 20th, and in the middle of this period began to suffer from nausea and vomiting at any hour of the day. The vomiting was not excessive, but continued almost daily until June. On May 15 she first noticed quickening, and movements continued up to November. There was amenorrhoea from March to the beginning of November. In September she suffered from a severe attack of pain, which lasted for nearly a week and which she imagined to be labour pains. Following this she began to complain of "general ill-feeling" and spasmodic abdominal pains that came and went for two months. There had been secretion in the breast throughout all this period, for she had only weaned her 3-year-old child in April. In November, during the first week, the abdominal pains increased in severity, and this condition was accompanied by a moderate loss of blood during fifteen days. In the first week each of December, January, and February she had a normal four-day period. During this time the abdominal swelling had not increased in size, but there was a progressive deterioration in health, with constipation and insomnia.

On May 1, 1937, I opened the patient's abdomen under spinal anaesthesia through a median subumbilical incision. The omentum was moderately adherent to the anterior and superior surfaces of the tumour wall and was easily separated with the fingers. The tumour had a pedicle, four inches wide and one and a half inches long, consisting of a double layer of thickened peritoneum with a few moderate-sized vessels, and with what appeared to be the cord-like left tube stretched across it. The pedicle was ligatured and cut without difficulty and the tumour lifted out. A little free serous fluid was present in the pelvis. The uterus, right ovary, and tube were normal; the left ovary could not be found. The abdominal wall was closed in layers.

The tumour consisted of a sac completely pressed about a fully developed female child. There were no anatomical deformities. The fibrous wall of the sac had a uniform thickness of 3 mm., except for a thickened portion having a diameter of five inches which served as the placenta and into which the eighteen-inch cord had a battledore-type insertion. The inner wall was lined by a thin and a thick membrane. A little dark gelatinous liquor amnii was present, while a great quantity of yellow meconium covered the surface of the child. The sac and "placenta" weighed three-quarters of a pound and the foetus 7¼ lb.

The foetal tissues had a plasticine-like consistency that received and retained digital impression. Skin—cream-coloured—and patches of lanugo were present over the right shoulder and over the lower lumbar region. The hair of the foetus was black and long, and that on the side of the scalp which had received the pressure of the sac wall separated off with slight rubbing. The eyeballs were markedly shrunken and were hidden deep in their sockets. The mucous membrane of the mouth was grey. The nails reached well beyond the finger-tips. The chest wall was collapsed; the anus and vaginal opening were widely patent; the intestines were dark grey in colour and empty. The heart was shrunken and contained a little dark, thick semi-gelatinous fluid.

On May 29 the patient was discharged well. Four months afterwards she reported an abortion in the third month.

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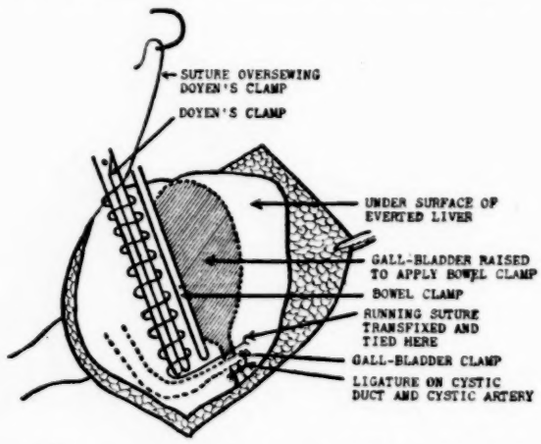
A Modified Cholecystectomy

The following account of a modified technique for cholecystectomy may be of interest.

TECHNIQUE OF OPERATION

The gall-bladder is exposed and the cystic duct and artery ligated. Doyen's clamp is then applied firmly in close apposition to the liver along the peritoneal attachment of the gall-bladder, in such a way that the points of the clamp meet the ligature which secures the cystic duct and artery. A bowel clamp is next applied parallel to the Doyen's clamp, and one-twelfth of an inch or less away from it. An assistant steadies the clamp and exerts a gentle downward traction while a scalpel blade divides the tissues between the two clamps, being kept close to the Doyen's clamp. An ordinary gall-bladder clamp is then attached to the cystic duct close to its ligature, and the duct is cut across between the clamp and the ligature. The freed gall-bladder is now removed with its clamps *in situ*.


SUTURE OVERSEWING DOYEN'S CLAMP
DOYEN'S CLAMP
UNDER SURFACE OF EVERTED LIVER
GALL-BLADDER RAISED TO APPLY BOWEL CLAMP
BOWEL CLAMP
RUNNING SUTURE TRANSFIXED AND TIED HERE
GALL-BLADDER CLAMP
LIGATURE ON CYSTIC DUCT AND CYSTIC ARTERY

With a full-curved round-bodied needle six to eight inches of No. 2 chromic catgut are then transfixed and tied at the end of the Doyen's clamp and adjacent to the cystic duct ligature. The same thread then lightly oversews Doyen's clamp to the extremity of the previously severed gall-bladder attachment. Doyen's clamp is then withdrawn and the running suture pulled tight and locked. A thin bloodless line of peritoneal tissue will then be found to represent the previous attachment of the gall-bladder.

COMMENT

This method has the following advantages: (1) there is no oozing of blood such as occurs during dissection of the gall-bladder from the liver; (2) a running suture can be applied in about one-quarter of the time occupied by the somewhat tedious method of dissection; and (3) there is no possibility of puncturing the gall-bladder. It is obvious, of course, that this new technique is not suitable for every case. It will be found of value, however, in many cases of empyema of the gall-bladder, for a minimum of soiling of tissues is incurred.

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Reviews

STANDARDIZATION OF VITAMINS

The Biological Standardization of the Vitamins. By Katharine H. Coward, D.Sc. (Pp. 228; 44 figures; 29 tables. 12s. 6d.) London: Baillière, Tindall and Cox. 1938.

For the purpose of her monograph Dr. Katharine Coward set out to gather together information that may be "of service to those workers who are engaged in the determination of the vitamin potency of food, of special preparations for therapeutic purposes, or of products obtained in the course of investigation of the chemical nature of the vitamins." In this task she has succeeded admirably. The book does not attempt to be a review of methods which are still in the process of elaboration. She has confined herself to those vitamins in which methods have been fully worked out and which she knows to be of value. In the preface she states: "I have drawn largely from my own experience, but I have been fully aware that in many laboratories the technique must be quite as good as my own and more suitable to the local conditions than my own could be. I have therefore dwelt largely on the principles which should underlie biological determination of the vitamins, giving details of my own or other techniques only as I myself know them to be good." In effect she has confined herself entirely to vitamins A, B_1, C, and D.

The first half of the book is given up to general principles, to a consideration of the animals suitable for biological standardization and the conditions under which they should be kept. Then she considers separately the various methods available for standardization of the four vitamins mentioned. This is followed by a chapter on the interdependence of the vitamins, in which Dr. Coward shows that in standardizing any given vitamin it is essential that the content of other vitamins in the animals' diet should be optimal. She finds that excess of other vitamins does not affect the conditions of standardization, and therefore it is wiser to err on the side of generosity. In the second half of the book she devotes some space to an admirably brief and simple examination of statistical methods designed to show how much the results are affected by variations between individual animals. Finally she considers statistically each of the methods she has described from the point of view of the accuracy obtainable. In each case Dr. Coward gives several different methods. Thus, for vitamin B_1 she describes four methods —namely, the cure of retracted neck in pigeons, the growth test in rats, the cure of convulsions in rats, and the cure of bradycardia in rats.

In the appendix there is a brief account of the second conference of the League of Nations Commission on Vitamin Standardization, and a table showing the vitamin content of some foods, expressed in international units per gramme. The book is carefully written, concise, and very clear, and should be well received.

SYPHILIS FOR THE MILLION

Ten Million Americans Have It! By S. William Becker, M.S., M.D. (Pp. 220; 6s. net.) Philadelphia, London, Montreal, New York: J. B. Lippincott Company. 1937.

The lay public is extraordinarily ignorant about venereal disease, and has very little idea of the prevalence of syphilis: a perusal of *Ten Million Americans Have It!* by Dr. S. William Becker, will cause it to open its eyes—as it is meant to do. This book is written primarily for the layman, but many medical practitioners will find much information in it which they did not possess before. Few people realize the ravages of syphilis, and still fewer have any idea of the extent of its prevalence.

America is becoming "syphilis-conscious," and a campaign is in motion to bring home to people the importance of the disease, the necessity for treatment, and the means of eradicating it. Dr. Becker's book puts the matter in such a way that the layman can understand how widespread the disease is, how it is acquired, what its effects are, how it may be treated, and how eventually it may be stamped out; in this respect it fills a gap, for no publication of this sort has appeared for many years. The author knows his subject, since he is associate professor of dermatology and syphilology in the University of Chicago, and though a large part of the work is technical any ordinary person will be able to grasp his meaning.

Such a well-written monograph is almost above criticism, but is it a fact that "the *majority* of patients with syphilis will go through the early stages of the disease without suspecting its presence" (p. 118); and will three injections of neoarsphenamine in five days always prevent the development of the disease if given from eight to forty-eight hours after exposure to infection (pp. 146–7)? We hope that this excellent book will have a wide circulation here as well as in America, and so make plain to the public the dangers of venereal disease and the necessity for taking all possible steps to stamp it out.

THE ABNORMAL PERSONALITY

An Introduction to Abnormal Psychology. By V. E. Fisher. Revised edition. (Pp. 533. 12s. 6d. net.) New York: The Macmillan Company. 1937.

A second edition of this book has appeared after seven years; much of it has been rewritten, though the general plan has been retained. After remarking how commonly we meet with abnormal persons and how often we may detect the abnormal psychological reaction in ourselves and in each other, the author adopts the wise plan of proceeding from the normal to the abnormal. He points out that the personality is the sum total of all aspects of the individual and of all the mechanisms of which he is made up and which he employs, and deals not only with the average normal but with variations encountered. He discusses introversion–extroversion at some length as well as other psychological variants, and also biological variants such as those described by Kretschmer. He then proceeds to discuss the adjustment of the personality to life, and contends that if this adjustment is to be satisfactory the individual must direct his interests and efforts towards future ends; he must achieve by his efforts a reasonable satisfaction of his own desires; his overt activities must be in reasonable accord with the dictates and demands of his group; and his inclinations must tend towards the perpetuation and future welfare of the race. The different methods of reaction to difficulties are next discussed: satisfactory methods, such as overt or implicit trial and error and inhibitory reactions; less satisfactory methods, such as compensations, rationalizations, and overreactions; still less adjustive methods, such as perseverations, negativism, regressions, and infantile reactions; and finally unsatisfactory reactions such as repression, self-repudiation, projection, and what the author calls undoing.

This leads naturally to the psychoneuroses, which the author describes under the headings of neurasthenia; anxiety neuroses; phobias, obsessions, and compulsions; hysteria; and multiple personalities. To Dr. Fisher the term "neurasthenia" has a connotation different from that

generally held in this country. He describes the neurasthenic as an introverted personality who is strongly motivated. That person's feelings and emotions are very intense, and he takes himself very seriously. He tends to react by compensation because he is too inclined to yield to the influence of the other person, and this may lead to negativism. He introspects endlessly in a search for the causes of his difficulties, and he rationalizes in order to keep himself from seeing that he is striving to retain and aggravate his own symptoms.

Psychopathics and epileptics are discussed as constituting a border-line between psychoneuroses and psychoses; and then follows a survey of the functional psychoses under the headings of manic-depressive psychoses; involution melancholia; paranoia and paranoid conditions; and schizophrenia or dementia praecox. Next general paresis, and alcoholic, drug, and senile psychoses are described as the commoner organic psychoses. Three chapters on sleeping, dreaming, and suggestion and hypnosis are inserted at the end of the section, partly because these reactions are important for the life of the individual and have an interest in themselves, and partly because they provide the student with a means of gaining considerable insight into the nature of mental organization and personality in general and, when carefully studied in relation to a specific individual, of arriving at a better understanding of that individual's particular personality or mental make-up. A chapter is also devoted to the feeble-minded individual, and there is a "last word on mental hygiene."

This is a well-thought-out and well-presented book, certainly worthy of the close attention of all those interested in psychopathology and psychotherapy.

MELLOR'S CHEMISTRY

A Comprehensive Treatise on Inorganic and Theoretical Chemistry. Volume xvi. By J. W. Mellor, D.Sc., F.R.S. (Pp. 811; 94 diagrams. 63s. net.) London, New York, Toronto: Longmans, Green and Co. 1937.

Mellor's *Chemistry* is now complete with the issue of the sixteenth volume. This volume deals with the metal platinum, and contains the general index. The preceding volumes have been described in this *Journal* as they appeared serially, and little can be said of the final volume that has not been said before. The present is, however, a fitting occasion for a recapitulation of the main features of the treatise. It is the most comprehensive work on inorganic chemistry that has yet been seen. The word "comprehensive" is not here lightly used. Information of every kind and of the most recondite nature is arranged and co-ordinated in a form that renders easy the search for knowledge of facts; and not only the knowledge of finally verified facts but the observations made in the experimental efforts of workers who only partially succeeded in their object. The treatise is all-embracing. A map illustrating the geographical distribution of platinum, a history of the scanty esteem it once enjoyed, statistics of its economic employment, a diagram showing its fluctuating price—all these are given in detail sufficient to satisfy every kind of inquirer. But all this wealth of detail belonging to the fringe of pure chemistry is insignificant by comparison with that concerning chemistry proper. Every kind of chemical reaction that has been recorded in literature is here set down in an arrangement connecting it with related or kindred reactions. The cost of the work involved in producing this arrangement is beyond estimate, as is also the extraordinary gift of ordered knowledge and power of grasp which were necessary to effect it. The bibliographical references are so exhaustive that it is difficult to believe that anything relating to inorganic chemistry has been omitted.

The work will long remain monumental in the world's chemical literature. The most exacting criterion of excellence is reached when a reader puts down a book with a new feeling of ignorance after perusing a subject that he thought he knew well. It is safe to say that, no matter in whose hands, this book may be judged by that standard and will pass the test.

DISEASES OF VULVA, VAGINA, AND CERVIX IN PREGNANCY

Maladies des Femmes Enceintes. IV. Affections des Muqueuses Génitales. By Henri Vignes. (Pp. 126; 2 figures. 24 fr.) Paris: Masson et Cie. 1937.

This volume is the fourth in the well-known series on the disorders of pregnancy edited by Vignes, and is devoted to diseases of the vulva, vagina, and cervix. It might be suggested that such a work is superfluous, for there is hardly any gynaecological condition which is not affected by pregnancy. But though every obstetrician is naturally familiar with the diseases described, their presentation in relation to the particular changes involved by pregnancy cannot but be of value in spite of a good deal of inevitable redundance. All the usual, and most of the rare, conditions are described in detail, but the main interest naturally lies in the therapeutic aspect. In this connexion it may be noted that the general lines of treatment suggested are mainly similar to those adopted in this country. Of particular interest is the discussion on carcinoma of the cervix, for the combination of malignancy and pregnancy is always a difficult problem, particularly when the growth is discovered about the twenty-eighth week. There has been much discussion, mainly in Belgium, as to whether it is justifiable in such a case to delay treatment until the child is safely viable, and it is the practice of some surgeons to leave the decision to the patient and her relatives. But the accelerated growth of carcinoma during pregnancy may change an operable tumour into a hopeless one within the course of a few weeks, while the sedative benefits of radium should not be withheld from an advanced case, for the patient will not in any eventuality survive parturition very long, and must also be subjected to the added strain of Caesarean section later on.

The work is well indexed, copiously annotated, and written with the author's characteristic fluency and style, and, though undistinguished by any striking innovation or originality, it is a most useful summary of a number of not uncommon combinations.

HANDBOOK OF TUBERCULOSIS FOR NURSES

A Manual of Tuberculosis for Nurses and Public Health Workers. By E. Ashworth Underwood, M.A., B.Sc., M.D., D.P.H. With an Introduction by Professor J. R. Currie, M.D., F.R.C.P.Ed., D.P.H. Second edition, revised and enlarged. (Pp. 404; 58 figures, 6 tables. 8s. 6d. net, postage 6d.) Edinburgh: E. and S. Livingstone. 1937.

Nurses occupy somewhat an anomalous position in connexion with the teaching of medicine, and the task of preparing a really satisfactory textbook for them is by no means simple. Dr. Underwood has gone a long way towards accomplishing such a task successfully in regard to tuberculosis. We welcome the publication of the second edition of his excellent little book, the scope of which has been appreciably widened in order that it should appeal not only to the probationer preparing for

examinations but also to graduate nurses and health visitors, and to persons less intimately associated with the tuberculous patient, such as almoners and sanitary inspectors. The book covers every aspect of tuberculosis, and deals fully and understandingly with nursing details and the relations of patient and nurse. It lays, however, too much stress on the principle of auto-inoculation as the basis of treatment in a sanatorium, which, moreover, is made to appear too much an educative centre and too little an institution in which active treatment is, or should be, carried out; and simplification of the indications for special forms of treatment, such as artificial pneumothorax, phrenic interruption, and sanocrysin, has been achieved at the expense of accuracy in the most modern light. Finally, some of the material included is really unnecessary, such as the treatment by nascent iodine, the description of the various tuberculins or the preparation of their dilutions. The illustrations, except for the badly reproduced chest skiagrams, are very good indeed, and a special word of commendation must be said in regard to the summaries at the end of the chapters and the glossary of technical terms at the end of the book. Altogether this is the best book we know of on tuberculosis for nurses.

Notes on Books

The Dissection and Study of the Sheep's Brain, by Mr. JAMES WILKIE of Guy's Hospital, is a type of book which we should like to see more of. It is a concise and accurate account of the brain of a macrosmatic mammal compared with that of the human brain; and since the olfactory part of the brain and the floccular and paraflocculer regions of the cerebellum are specially well developed in the sheep, their study in the sheep's brain should prove a valuable help in obtaining a clear conception of these parts in the human brain, in which they are only feebly developed. By a comparison of the degree of development of such parts as are known or are believed to be associated with particular functions, the knowledge obtained by experimental evidence of localization of function may be very materially assisted, and we confidently recommend the book to all who are interested in the comparative anatomy and functions of the brain. It is published by Humphrey Milford, Oxford University Press, at 6s.

The fact that a second edition of Dr. CYRIL BURT'S book on *The Subnormal Mind* has been called for little more than two years after the publication of the original edition is perhaps the best testimony to its value and practical usefulness. The interval has indeed been so short that very little change in the text has been necessary. Beyond a general revision the only difference between the editions is that there has now been added an appendix giving a useful list of stimulus-words for the free association test. In the *Journal* of September 28, 1935, there was a review of the first edition. We may remind our readers that we then assessed its merits and value highly, and that it deals with its subject very fully and in a manner which is directed towards its use in practice by both the doctor and the teacher, as well as constituting it an excellent textbook for students in both professions. Its successive chapters deal with the normal mind, the mentally deficient, the dull or backward, the delinquent, the neurotic, asthenic neuroses, sthenic neuroses, and ascertainment and incidence. Although this new edition (Oxford University Press, 10s. 6d.) contains a few pages more than the original, it is of similar make-up and slightly smaller in handling.

We have received the fifth edition of Dr. OLIVER S. ORMSBY'S well-known *Practical Treatise on Diseases of the Skin* (Kimpton, 52s. 6d.). It is a substantial and comprehensive work, and the author, who is assisted by Dr. C. W. Finnerud on the pathological side, has done his best to prevent the book from growing into too unwieldy dimensions with its successive editions. It is well illustrated, mostly from good photographs, but the three coloured plates hardly come up to the general standard of excellence maintained by Dr. Ormsby.

The Essentials of Pharmacology, Materia Medica, and Therapeutics for Medical Students, by Dr. D. M. MACDONALD, is a pocket volume of 280 pages (Kimpton, 7s. 6d.). Special attention is paid to the description of the characters of drugs and the forms in which they can be prescribed. The book opens with brief but valuable notes on prescribing, incompatibility, channels of administration, poisons law, etc.

A new American *Handbook of Orthopaedic Surgery*, by Dr. A. R. SHANDS, jun. (Kimpton, 21s.), has the merit of not being too long, and the information is reasonably up to date, although an American bias is unmistakable. Illustrations are an important part in a book on orthopaedics, and it is therefore surprising to find that each one is a drawing or diagram, even the radiographs. It is difficult to see why the last should not be properly reproduced as photographs. The whole effect is very nineteenth-century. The author has succumbed to the attractions of the rare disease when he could ill afford the space. He gives a page to fungus infections of bone, but has little to say about the treatment of active rickets: "The treatment of its active stage is of a pediatric nature." This is carrying specialization too far. The book also suffers in that principles of treatment are either neglected or submerged in a mass of detail.

Preparations and Appliances

MAGNIFIER FOR SMALL OPERATIONS

Dr. F. OLIVER WALKER (Dartford, Kent) writes:

I have often felt the need of a powerful magnifier which could be used for the removal of foreign bodies from the eye. I had tried a watchmaker's eyeglass. This was not entirely satisfactory owing to the difficulty of holding it in the orbit and

because of steaming of the lens. I consulted Messrs. Clement Clarke, Ltd., of 16, Wigmore Street, W.1, and suggested to them that they might make me a spectacle to my own correction and a 14 OD lens, this lens to be fitted on a swinging arm in front of one eye, in my case the left, because the left is my master eye. There is a spring clip which keeps the lens out of the way when not required.

I find the device excellent in every way, since it leaves my hands free for the removal of a foreign body or for the purpose of other minute operations. Such a device might also be useful to dermatologists or to biologists for minute dissections. In fact its uses could be endless. I would suggest that it would be useful to watchmakers, jewellers, and others. The spectacle is comfortable in wear and the lens is in a well-balanced position. I am grateful to Messrs. Clement Clarke for their co-operation and help in producing the spectacle.

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PAIN AND DISEASE

Physiological investigations during the last decade, particularly those of Professor E. D. Adrian[1] in this country, have much clarified our ideas of the mode of action of the sensory organs, especially those in skin and muscle. There is still uncertainty about the exact anatomical identity of the nerve-endings in the skin which subserve pain, touch, and temperature, but there is little doubt that there is in each case a specific type of nerve-ending which responds to the appropriate stimulus and to none other. Similarly, the muscle spindles and tendon organs respond specifically to changes in tension produced by stretch or by active muscular contraction. Little, however, is known about the nerve-endings responsible for pain sensitivity in muscle, though there is no doubt that various experimental procedures and disease conditions may set up pain in these structures. The *quality* of a sensation depends on the properties (largely not understood) of the region of the brain in which the impulses from the sense-organ end. To take a well-known example: activation of the appropriate region of the occipital cortex gives rise to the sensation of sight whether it is brought about by light falling upon the eye, artificial stimulation of the optic nerve trunk, or irritation of the cortex itself. The *intensity* of the sensation depends on the frequency of the impulses set up in the peripheral sense-organ, and this may vary from a few to several hundred per second. The *extent* of the area stimulated is judged from the number of afferent fibres simultaneously activated, and this in turn is related to the number of nerve-endings which are discharging. Less is known about the way in which sensation is localized, but probably this depends on the anatomical connexion of points in the peripheral sensory field with special groups of cells in the sensorium. The sensation of pain is of special interest both to doctor and to patient, if only for the reason that it is so often responsible for bringing them together. It is quite clear that pain must be regarded as a specific sensation, and not as a mere intensification of other sensations. Our knowledge of visceral sensation is more fragmentary. Normal afferent impulses from viscera do not reach consciousness but expend themselves in producing various reflex modifications of visceral or somatic activity. The extent and importance of the changes that they can set up are ably dealt with in a recent monograph by Schweitzer.[2] Thus, stimulation of the central end of the vagus,[3] distension of the urinary bladder, or gentle handling of the small intestine may diminish muscle tone and abolish the knee-jerk. Similarly, increasing the pressure in the carotid sinuses not only reflexly affects circulation and respiration but also may modify skeletal muscle tone and induce a condition indistinguishable from normal sleep. In exceptional circumstances stimulation of the viscera may give rise to pain which may be vaguely localized or referred to distant parts. In the case of the gut the appropriate stimulus is usually a change of tension in the muscle coat; in the case of the heart it results from the action of chemical substances liberated during ischaemia. The important researches of Morley[4] and Capps[5] have proved the reality of referred pain, particularly from the parietal pleura and peritoneum. Thus stimulation of the central part of the diaphragmatic pleura gives rise to pain which is referred to the neck and shoulder; this is attributed to the fact that both regions are supplied by the same segments of the cervical cord. Similarly, stimulation of the peripheral part of the diaphragm, which is supplied by the lower thoracic nerves, gives rise to pain which is referred to the somatic distribution of these nerves in the skin and muscles of the abdominal wall and back.

An important advance in our understanding of somatic pain is made in Sir Thomas Lewis's interesting paper in this issue on page 321. Using the simplest of experimental methods with characteristic skill and elegance, he has reclassified somatic pain and described methods of investigating it in patients. A complete description of pain should "comprise a statement of severity, of kind or quality, of relation to time, and of the locality and the circumstances in which it is felt." "Severity" is briefly dismissed because it is thought to be too dependent on the mental and emotional make-up of the patient to be gauged with any accuracy. Stress is laid on the duration, and more especially on the time-intensity curve, of pain for diagnostic purposes. The pain of angina pectoris, for example, rises to a plateau and lasts for a long time with little fluctuation before diminishing and vanishing; on the other hand, inflammation of the dental pulp causes pain which is felt in rhythmic pulses. Localization of the site of pain is of the greatest importance, but becomes difficult when one deals with the deeper visceral and somatic structures. Detailed information on this point is not readily elicited when much time has elapsed since

[1] *Basis of Sensation*, London, 1928; *Physiol. Rev.*, 1930, **10**, 336.

[2] *Die Irradiation Autonomer Reflexe*, Basel, 1937.

[3] Schweitzer, A., and Wright, S. (1937). *J. Physiol.*, **88**, 459.

[4] *Abdominal Pain*, Edinburgh, 1931.

[5] *Clinical Study of Pain*, New York, 1937.

the pain was experienced. Sir Thomas emphasizes the importance of assessing the quality of the pain. The common descriptive terms such as "tearing," "boring," "cutting," or "stabbing" are of little value. Clear-cut evidence is presented that three kinds of somatic pain exist, coming respectively from skin, muscle, and tendon, and differing qualitatively in their characteristics. Skin pain is always of the same quality, whether it is produced by pricking, burning, passage of an electrical current, or the application of irritant poisons. The short painful stimulus produced in any of these ways gives rise to a sensation best known as "pricking." More prolonged stimulation of the skin sets up a "burning" pain, whether it is due to heat or not. No additional term need be introduced to describe the pain which is the after-effect of injuries such as continued friction or ultra-violet burns, as it has no distinctive qualitative characteristics. Examination of the muscles shows that they can be the seat of a distinctive pain which is disagreeable, continuous, possibly wavering a little in intensity, diffuse, and difficult to locate; though indescribable, it is quite different from skin pain. It can be produced by such varying procedures as exercising a muscle under ischaemic conditions,[6] squeezing the muscle violently, or injecting into it hypertonic or acid isotonic saline solutions. A point of clinical interest is that muscle pain may often be referred to distant parts. The third kind of pain recognized by Sir Thomas Lewis he calls "web" pain, because it is easily elicited by squeezing the short web of skin between adjacent fingers; but pain indistinguishable qualitatively can be elicited by appropriate stimulation of tendon or periosteum. Sir Thomas suggests that the most satisfactory way of detecting objectively the quality of a pain felt by a patient is to reproduce each of the three kinds of pain already described, preferably during an attack of spontaneous pain, and to ask the patient to judge whether any one of them is identical with the pain which he is experiencing. In this way, in an observant and co-operative subject, evidence as to site of spontaneous pain can probably be obtained. This method may be of special value in the differentiation of the different forms of headache; during quiescent periods pain could be experimentally induced from the muscles or aponeuroses attached to the occiput to see whether it resembles or differs from that of which the patient ordinarily complains. Such studies can be extended by attempting to reproduce the pain, not only as regards quality and distribution but also as regards intensity and the circumstances in which it naturally arises. This is well shown in the experimental reproduction of the muscle pain of intermittent claudication or the skin pain of erythromelalgia by appropriate means.

Many additional questions will occur to every reader once the subject has been clarified so far, and they will doubtless be answered by future research. Is, for example, the referred somatic pain of visceral disease distinctive in quality or is it identical with one of the three types recognized by Sir Thomas Lewis? If the latter is found to be the case interesting conclusions follow. It has already been pointed out that the quality of pain, as of all sensations, depends on the region of the sensorium activated. If visceral referred pain proves to be identical with some form of somatic pain it would mean that visceral afferent impulses can irradiate widely in the brain to reach the cerebral areas normally concerned with the recognition of pain of somatic origin. Again, is the "protopathic" pain which is felt during recovery from nerve lesions a distinctive entity, and what is the quality of so-called central pain? Posing these questions will probably lead to their satisfactory elucidation. But theoretical considerations aside, Dr. J. H. Kellgren's paper on page 325 of this issue shows that immediate practical results may follow rapidly on a seemingly academic inquiry. He finds that in painful muscular states usually called "myalgia" or "fibrositis" localized areas can be found which are tender to palpation; if pressed upon a diffuse widespread pain is set up similar to that from which the patient suffers during his attacks. Evidence is presented that this more generalized pain is probably of the referred type. When the tender spots are infiltrated with a local anaesthetic both the localized and the referred pain disappear, sometimes for periods as long as one to four weeks. Dr. Kellgren's fuller account will be eagerly awaited, but enough clinical details are given to indicate the probable value of this form of treatment; it certainly offers scope for useful work on the part of the general practitioner. It is clear also that other forms of local therapy such as heat and massage or radiation might be more usefully applied to the local tender spots which are probably the actual foci of disease rather than to the wider area of referred pain or disability.

[6] Lewis, T. (1932). *Arch. intern. Med.*, **49**, 713.

LONDON WATER IN 1936

The high standard of purity which is justly claimed for the water supplied by the Metropolitan Water Board to the London area has been achieved as a result of the efficient operation of an imposing and well-devised system of reservoirs, wells, filters, and other purification plant. The whole structure

is now so smooth in working and so firmly established, and has for so many years been steadily producing its high-grade water, that, as Colonel Harold suggests in his report for 1936,[1] it might well be imagined that an elaborate scheme of laboratory examinations, such as has hitherto been in use for the purpose of checking efficiency, would cease to be necessary. Yet it is not so. Gross defects in water are easily recognized and when present may mask minor imperfections. But when major flaws have been brought under control a new world opens out before the scientist, who finds that he has now to apply himself to the more difficult task of keeping perfection perfect. *Crescit eundo* may be said of water laboratory work. That such at least is the anticipation of the Metropolitan Water Board may be deduced from the circumstance that in the new chemical and bacteriological laboratories which are now under construction at New River Head it is intended that the accommodation should exceed by at least one-third that available in the existing rooms at Nottingham Place, Marylebone.

The fifty-five chalk wells which contribute water to London are all of high quality judged by chemical tests, but those in one area are known to be subject to standing pollution owing to the access of river and other contaminated waters to the water-bearing strata by way of swallow holes and fissures. The remedial method pursued is to pump the water from the whole group into a large spring, which is itself liable to similar contaminations, and to apply means of purification to the combined flow, treating it as raw river water. Among the remaining wells those of Kent have long been famous. They yield "a perfect drinking water of matchless clarity and brilliance, of pleasing hardness, and stimulating the palate." Many of them continue for substantial periods to give a zero bacterial count in as much as 10 ml. of water, so purifying is the passage of the water which feeds them through the vast capillary sponge-work of the chalk. Under certain conditions which arise from time to time fissures in the strata may convey pollution to the wells over a distance of several miles, but by reason of their normal state of high bacterial purity they are amenable to the laboratory procedures which can be brought into play where major defects are absent. The main body of the pollution, which would be recognized by the presence of typical colon bacilli, appears to throw out, as it approaches, a light advance guard of atypical colon bacilli, and it is the concern of the water bacteriologist to pick up these patrols on their very first appearance, in order that precautionary measures may at once be applied. Colonel Harold expresses the view that where atypicals are becoming prevalent it is indefensible to delay action until the establishment of the dominance of typical forms. Pollution may increase a hundredfold or even a thousandfold within a few hours. In London an emergency chlorination plant is kept in readiness for immediate installation in such cases. Another example of the importance of atypical *Bact. coli* strains, and at the same time an instance of the close liaison which exists between the laboratory department and that of the chief engineer, is exhibited by the course of events at a particular works where the filtered water had begun to show a high proportion of atypicals. Quite suddenly the whole output of the works fell to the standard of *Bact. coli* present in 1 ml. Immediate action by the chief engineer put all doubtful sections out of commission. All the suspect filter beds and internal culverts were overhauled, found defective here and there, and repaired where necessary. Improvement in the water resulted but not complete cure. Finally the investigation was extended to a clear water culvert passing under a roadway which was subject to increasing traffic vibration. It was found that water from the roadway was entering this culvert, atypical colon bacilli being present in 1 ml. of the entering water.

The great reservoirs which figure so conspicuously and usefully in the London scheme are apt to develop internal disturbances often occasioned by the abnormal proliferation of the algae, diatoms, and similar organisms which normally live in their waters. The results, while not of a pathogenic character, may be disturbing to consumers, and judicious measures for the regulation of these forms of aquatic life are in continual use. Cuprichloramine has been found effective for the control of algae, but copper sulphate is less successful. When applied to the Barnes reservoir it killed off *Fragillaria*, but a minute green flagellate alga promptly assumed command in its stead and coloured the reservoir water a bright green. In another instance in hot weather the Hornsey filters suddenly turned green. *Chlamydomonas* was the peccant organism, and as it possesses the power of passing through sand filters immediate action was necessary in order to prevent alarm. The organism was, however, known to be phototropic, and tests showed that in the bright sunshine of the time it massed itself during the day, when engaged in its pursuit of light, in the topmost foot of the water overlying the filter beds. The engineer was instructed to raise the water level to such a height as would run the topmost foot to waste. The layer

[1] Metropolitan Water Board. Thirty-first Annual Report on the results of the chemical and bacteriological examination of the London waters. By Lieutenant-Colonel C. H. H. Harold, M.D., D.P.H., Director of Water Examination. P. S. King and Son Ltd. (10s. 6d.)

was run off accordingly, carrying the bulk of the intruders with it. As regards the animal kingdom two discoveries of the year are the amphipods *Niphargus equilex* and *Eucrangonyx gracilis*, the former an eyeless shrimp, the latter hitherto unknown in this country but reported from Canada and the U.S.A. They reside mainly in culverts.

Special investigations were made relative to the Eijkman test, the indole presumptive test, the coli-aerogenes group, the Voges-Proskauer reaction, and the streptococcus test for pollution. The chemical section presents a diagram and specification of a photo-electric device for the measurement of turbidity, which is important for determining the suitability of raw Thames water for admission to the reservoirs. A parallel beam from an electric lamp is passed through the water sample to be tested and impinges upon a photo-electric cell connected up with a galvanometer, so eliminating the personal factor from these observations. The total number of samples examined at the laboratories during 1936 was 35,075, of which 19,503 were routine bacteriological, 244 special bacteriological, 4,480 routine chemical, and 1,117 special chemical. Of the total samples from the filtered supply 96.5 per cent. contained no *Bact. coli* in 100 ml. of water. For waters chloraminated terminally the corresponding percentage was 98.7; for waters not chloraminated terminally it was 88.8. The daily average of water filtered in 1936 was 290,860,000 gallons.

CONTROL OF INFECTIOUS DISEASES

The Control of Syphilis and other Infectious Diseases[1] by Dr. Thorvald Madsen includes the subject-matter of five Abraham Flexner Lectures delivered at Vanderbilt University, U.S.A. The other subjects comprise the mechanism of bacterial infection, tuberculosis in Denmark, the influence of seasons on infection, and whooping-cough. Dr. Madsen needs no introduction seeing that he is head of the State Serum Institute, Copenhagen, and chairman of the Health Committee of the League of Nations. It is well known that the campaign against venereal diseases in general and syphilis in particular has been more successful in the Northern European countries and especially in Denmark than elsewhere, and this is attributed to three main factors: (1) free treatment of all venereal patients, (2) obligatory treatment of all infectious cases, and (3) punishment for the transmission of venereal diseases. To these may be added the facts that Denmark has a homogeneous law-abiding population, the general level of education is high, and the quack is conspicuous by his absence. Experiments seem to show conclusively that peroral bacterial infection always spreads along the regional lymph channels of the digestive tract to the regional glands, thence by way of lymphatics to the thoracic duct, and so via the blood stream to the viscera; usually the blood does not appear to exercise bactericidal properties, these being a function of the fixed phagocytes of the liver and spleen. Curiously enough, foot-and-mouth disease, which is much in the picture nowadays, behaves differently, in that the virus could often be demonstrated in the blood and not in the liver and spleen. Tuberculosis in Denmark has been tackled as efficiently as venereal diseases; tuberculin testing is carried out on a large scale, and B.C.G. vaccination for the negative reactors is advocated in suitable cases—such as medical students and nurses; and the view is taken that rather than try to eradicate tuberculosis it is better to modify the course of the infection so that it becomes protective rather than destructive. The influence of seasons on the incidence of various diseases is a subject of absorbing interest, and in Table V we are shown the maxima and minima for a number of infections—for example, diphtheria is at its worst in January, bronchopneumonia and mumps in February and March, whereas August is the month for cholera, September for typhoid, and November for scarlet fever. Whooping-cough causes just as many deaths as other diseases of childhood and should therefore be treated more seriously than it is. Early bacteriological diagnosis is easy if a suitable medium is employed; and, according to Dr. Madsen, vaccination is of great value for prophylactic purposes and to a lesser degree for treatment.

[1] *Lectures on the Epidemiology and Control of Syphilis, Tuberculosis, and Whooping Cough.* By Thorvald Madsen, M.D. Baltimore: The William and Wilkins Company. London: Baillière, Tindall and Cox. 13s. 6d.

DIAGNOSIS OF VITAMIN A DEFICIENCY

Three recent papers[1 2 3] all confirm the claim of Jeans and Zentmire that objective measurement of the time taken for the human eye to adapt itself to changes in light intensity is a fairly accurate measure of the body's reserves of vitamin A. A relation between defective diet and night blindness has been recognized for a long time: Hippocrates prescribed ox liver for it. In 1925 Danish workers showed that in vitamin A deficiency, before xerosis of the conjunctiva becomes apparent, the restoration of visual purple after bleaching by bright light is delayed. Several techniques have been developed for measuring night blindness objectively at the stage before the subject is himself aware that he has defective night vision. Numerous objections have been raised against the view that such a test really reflects the patient's reserves of vitamin A. It is obvious that certain intrinsic visual defects must be excluded in each patient, but when this is allowed for there is clear evidence of a connexion between night blindness and the state of the vitamin A reserves. Most of the objections are disposed of by the demonstration that in most patients the results in the test are much improved, often within an hour's time, by administration of large doses of vitamin A. It is of course possible that practice makes perfect, and improvement

[1] *J. Amer. med. Ass.*, 1937, **109**, 756.
[2] *Lancet*, 1937, **2**, 1009.
[3] *British Medical Journal*, 1937, **2**, 565.

with practice does occur; but all workers are agreed that it is slight and quite insufficient to account for the remarkable improvement which follows vitamin A therapy. A close relation has repeatedly been found between the incidence of night blindness and the previous diet of groups of individuals. Jehgers,[1] for example, studied the dietary history of university students who had been placed by the dark-adaptation test into two groups—normal and subnormal. The diets of the normal group were calculated to contain an average of 5,560 international units of vitamin A, with a range from 3,300 to 9,000 units. The subnormal group averaged 2,445 international units, with a range from 900 to 4,000. Maitra and Harris[2] found that of 200 elementary school children in London and Cambridge from 22 per cent. to 36 per cent. were in the "definitely subnormal" category, whereas at a public school examined at the same time none of the boys was definitely subnormal. Mutch and Griffith,[3] examining university students, mill girls, industrial school boys, and children of working-class parents, found that only the university students failed to improve after a single large dose of vitamin A. We do not yet know what is an adequate intake of vitamin A, but there can be little doubt that a significant improvement in dark vision after a single large dose of vitamin A is presumptive evidence that the vitamin A content of the patient's diet was previously inadequate. When the improvement is observed in groups of people low in the economic scale and not among people who are better off the evidence becomes less presumptive. As Mutch and Griffith point out, the important dietary sources of vitamin A—milk, butter, eggs, liver, carrots, and green vegetables—are relatively expensive foodstuffs, and deficiency will therefore be commoner among poor people. There seems little doubt that the objective testing of dark vision will almost always detect minor deficiency before any other clinical signs are present, and it is to be hoped that in the future most hospitals and clinics will be in the position to conduct it.

INDUSTRIAL WELFARE THE WORLD OVER

The annual report of the Industrial Welfare Society for the year ended June 30, 1937, states that the society has maintained and increased its foreign and colonial contacts. The director, the Rev. Robert Hyde, after spending some weeks in Sweden, meeting leading Swedish industrialists and visiting factories in several towns, found that much could be learned from this extremely prosperous country, and that the encouragement of close friendships would be to the mutual advantage of the two nations. Many oversea visitors have consulted the society, seeking information on problems concerning health, co-operation, accident prevention, and security in industry. Among these were three Japanese doctors, and representatives of social organizations and research students from Belgium, Finland, Hungary, Turkey, Palestine, and many other countries. The council feel that close links may thus be forged between ourselves and other nations, which will make for better international understanding. With regard to health in industry the report pays a tribute to the medical services of individual firms. Although the toll of occupational diseases has decreased, the efficiency and happiness of the individual worker is still too often impaired by fatigue and vague ill-health. The works doctor, with his special knowledge of the employees and the processes on which they are engaged, is in a position to carry out valuable preventive work.

THE TIME OF OVULATION

The recent work of Ogino[1] and Knaus[2] on the control of conception by the limitation of coitus to the so-called "safe" period has stimulated a good deal of research into the question of the exact time of ovulation, for it is upon this that the necessary calculations are based. The determination is usually done on the assumption that ovulation occurs around the fourteenth day after menstruation, with variations according to the individual type of cycle. This assumption is based on operative findings, on observation of patients in whom rupture of the follicle is accompanied by painful symptoms (intermenstrual dysmenorrhoea), and on direct palpation of the growing follicle (Dickenson).[3] There is, however, so much individual variation that Knaus's method, with its guesswork calculation, cannot attain sufficient scientific accuracy to enable the ovulation time to be determined with any real degree of exactitude, and it is for this purpose that Rock, Reboul, and Wiggers[4] have elaborated their electropotential technique. This is based on the previous work in animals of Burr, Hill, and Allen,[5] who were able to demonstrate that a difference of potential arose with ovulation in the rabbit and that this electrical disturbance could be measured by means of a vacuum-tube potentiometer. In the human being the difference is recorded by the projection of a reflected beam from a moving-cell galvanometer connected with specially constructed vaginal and abdominal electrodes, and in the case reported quite definite results were obtained. A sudden sharp change in potential, lasting about an hour, was coincident with ovulation (as verified by subsequent laparotomy), the difference from normal attaining the very considerable amount of 7 millivolts. This has since been verified in a later case, and it does appear that the technique described provides a more accurate index of the time of ovulation than has hitherto been available. Whether this is clinically important, and whether the discomfort and tediousness of the method are justified by its somewhat theoretical value, is doubtful, and it is more than possible that the electrical changes found are due to the exaggerated tubal contractions which follow ovulation rather than to that function itself. But the demonstration that these cyclic phenomena can be recorded with such accuracy is a valuable discovery, and its further appli-

[1] *Jap. med. World*, 1928, **8**, 147.
[2] *Periodic Fertility and Sterility in Women*. Vienna: Urban and Schwartzenberg, 1934.
[3] *Human Sex Anatomy*, London: Baillière, Tindall and Cox, 1933.
[4] *New Engl. J. Med.*, 1937, **217**, 654.
[5] *Proc. Soc. exp. Biol. N.Y.*, 1935, **33**, 109.

cation will be followed with much interest. Further point is given to these researches by the recent statistical inquiry into menstrual periodicity carried out by Gunn, Jenkin, and Gunn.[6] As the result of a detailed investigation into the menstrual histories of nearly 1,000 women these workers concluded that the variation is so considerable that it is impossible to specify a menstrual "type," in the sense of a regular interval. While this statement may appear rather sweeping, there is no doubt that it is true enough to emphasize the inaccuracy of the Ogino–Knaus calculations and to add point to the value of alternative methods.

RESULTS OF SANATORIUM TREATMENT

It is now generally recognized that the remote results of "sanatorium treatment" are far from satisfactory, and there is a tendency to throw all the blame for this on inadequate "after-care." The actual methods of treatment carried out in the sanatoria are rarely questioned. That more attention needs to be paid to these is impressed upon us by reading, in his annual report for 1936, the results obtained by Dr. Peter W. Edwards at the Cheshire Joint Sanatorium. Of 331 patients, no fewer than 210 (65 per cent.) stayed over six months. Artificial pneumothorax was given to 199 patients, phrenic evulsion was carried out in 91 and adhesion-section in 108; gold salts were administered to 125 patients. The immediate results, as judged by the finding of tubercle bacilli in the sputum, are particularly striking in view of the fact that in this institution concentration and culture methods are routine procedures when bacilli are not found by direct examination: 65 per cent. of the patients admitted had tubercle bacilli in the sputum, which were present in only 23 per cent. of those discharged. A negative sputum examination was obtained finally in all those classified as T.B.+1, in 70 per cent. classified as T.B.+2, and in 52 per cent. classified as T.B.+3. Dr. Edwards gives the ultimate results in 3,452 patients for a period covering one to twelve years after discharge from the sanatorium, with particular reference to those treated by artificial pneumothorax and by phrenic evulsion. The amazingly small number of fifty-seven (1.65 per cent.) were untraced. The percentages of patients still alive in March, 1937, in the groups T.B.−, T.B.+1, T.B.+2, and T.B.+3 were 80, 84, 61, and 21 respectively. Of the patients selected for artificial pneumothorax from 1924 to 1932 in whom phrenic evulsion was also carried out 83 per cent. were alive four years later when the collapse was complete; 60 per cent. when it was partial; and 46 per cent. when the induction failed. The respective percentages in similar groups when phrenic evulsion was not done were 62, 22, and 25. The results of artificial pneumothorax induced between 1924 and 1934 with and without phrenic evulsion, "according to choice," and according to the Ministry of Health classification, as judged by survival to March, 1937, are also indicated in tables. These results, both immediate and remote, as set out in the report are much superior to those usually published from other institutions, and speak greatly in favour of artificial pneumothorax and of phrenic evulsion. The claims made at the Cheshire Joint Sanatorium therefore appear to deserve careful statistical examination by an independent authority. If confirmed, the findings of Dr. Edwards should show the way to improving the results of sanatorium treatment by directing attention to methods of treatment in institutions as well as to after-care. In one other respect the report is outstanding—in the amount of pathological work carried out in the well-equipped pathological laboratories. It emphasizes the indispensability of such a department in every institution for the treatment of tuberculous persons.

[6] *J. Obstet. Gynaec. Brit. Emp.*, 1937, **44**, 839.

LAURA BRIDGMAN

The Perkins Institution for the Blind in Watertown, Massachusetts, recently celebrated an interesting centenary. In 1837 the first blind deaf-mute to be taught the use of language was admitted to this pioneer school. As an infant Laura Bridgman had suffered severely from fits. In her twenty-fourth month she had an attack of scarlet fever, which destroyed both sight and hearing and almost completely abolished smell and taste. At the age of 8 this triply handicapped child attracted the attention of Samuel Gridley Howe, first director of the school, who succeeded in penetrating her darkness and helped her to adjust herself to life through the sense of touch. She learnt to sew, and her embroidery was so beautiful that she became a teacher of sewing in the institution. She was kept alert and happily occupied until her death at the age of 60 in 1889. Her story, which Dickens tells in his *American Notes*, is pleasantly related in the December number of the *Scientific Monthly* (1937, **45**, 573). Its scientific aspects were discussed by Professor Frederick Tilney in a paper entitled "A Comparative Sensory Analysis of Helen Keller and Laura Bridgman," which was published in *Archives of Neurology and Psychiatry* (1929, **21**, 1227).

A special lecture on "Some Recent Work in Experimental Cancer Research" will be given by Dr. W. E. Gye, Director of the Imperial Cancer Research Fund, at the Royal College of Surgeons, Lincoln's Inn Fields, W.C., on Wednesday, February 16, at 5 p.m.

We regret to announce the death of Sir Josiah Court at the great age of 97. He qualified M.R.C.S. in 1863, and will long be remembered for his investigations into the aetiology and incidence of miners' nystagmus.

An address entitled "The Doctor in the Home" will be given to senior students of the twelve medical schools in London and to those who have qualified in the last two years by Sir Kaye Le Fleming, M.D., Chairman of Council of the British Medical Association, on Tuesday, March 8, at 5.30 p.m., in the Great Hall of B.M.A. House, Tavistock Square, W.C. Tea in the Members' Lounge from 5 to 5.25 p.m. A film illustrating the work of the Association will be exhibited at 5.15 p.m., and after the address there will be a "talkie" film dealing with physical fitness education, a subject to which Sir Kaye will allude. Fourth- and fifth-year students who do not receive a card of invitation by February 27 should seek one from their Dean, or from the Honorary Secretary of the Metropolitan Counties Branch at B.M.A. House.

SURGICAL PROCEDURES IN GENERAL PRACTICE

This is one of a series of articles contributed by invitation

ERYSIPELAS AND CELLULITIS

BY

JOHN HOSFORD, M.S., F.R.C.S.

Erysipelas is an inflammation due to a streptococcal infection in the lymphatics of the skin. It is most characteristically seen on the face, and more often than not there is no obvious origin of the infection. In other cases, both on the face and elsewhere in the body, erysipelas starts either from a punctured wound or minute crack, or from an open infected wound. Its characteristic red appearance, with a well-defined slightly raised edge and minute vesicles, is unmistakable. The usual acute form is associated with marked constitutional symptoms and a high temperature. There is also a less acute type in which the pyrexia is of low degree and the patient not gravely ill: this form is sometimes recurrent at several weeks' interval.

Like that of other acute infective conditions which the surgeon meets with, the treatment of erysipelas is both local and general; but erysipelas is unlike most of the others in that the general treatment is of very great value and more important than the local. In the past many drugs, mostly of the type of antiseptics given intravenously, have been tried, but without benefit. Streptococcal sera and vaccines, sensitized and otherwise, have been used, though never with any convincing success.

Since the introduction of sulphanilamide as a remedy in streptococcal infections, however, we have a drug of the utmost value in the general treatment of erysipelas. In fact, erysipelas is one of the conditions in which sulphanilamide has had its greatest success. Its full name is para-aminobenzenesulphonamide, but it is put up by various firms, usually in 7½-grain tablets, under such names as sulphonamide-P, streptocide, prontosil album, and sulfanilamide. It is a white crystalline solid, and is given in tablet form by mouth. In order to maintain its concentration in the blood stream it is better, in the acute stage, to spread it over the day. It may be given four-hourly, one tablet at a time, with two night and morning, making a total of eight tablets, equal to 60 grains, for the whole day. The above dose, which is the average for a man of 10 st., should be adjusted to the size of the patient, and may be exceeded for a few days. When giving sulphanilamide certain precautions should be taken to prevent the complication of sulphaemoglobinaemia, which is caused by absorption of hydrogen sulphide produced in the colon. This condition is easily recognized, as the patient becomes cyanosed. To prevent its onset no purgatives must be given and the patient should be placed on a high-calorie low-residue diet and take liquid paraffin night and morning. Amidopyrine (contained in allonal) is forbidden, and phenacetin should be avoided if possible. Sulphanilamide may be prescribed at any stage of erysipelas, but of course the sooner it is given the sooner will it cut short the attack. In most cases it has a profound, sometimes dramatic, effect: the temperature drops to normal in forty-eight hours or less, the rash fades, and the patient feels better. During this period he must of course be kept in bed. In some cases in which, following the administration of sulphanilamide, the temperature has quickly dropped and the local condition improved, a relapse has occurred when the drug has been immediately stopped. It is advisable to continue giving the drug, though in slightly smaller doses, for four days after the temperature has been normal. Agranulocytosis, which is a rare complication of prolonged sulphanilamide treatment, is most unlikely to come on after such a short course of treatment, but particular care should be taken with feeble or anaemic patients. Pain is not usually severe, but if it is morphine or its derivatives should be given, as rest and sleep are essential. Increased quantities of fluids should be taken, but, as already mentioned, purgatives must be forbidden.

So many lotions and ointments have been tried as local applications for erysipelas and given up that clearly none of them is of real value. Ichthyol has been very widely used, but its benefit is doubtful, though its smell, colour, and associated mess are impressive. When the inflamed area feels hot and painful relief may be given by applying gauze soaked in lotio plumbi. To prevent the spread of erysipelas it has been recommended that the healthy skin just beyond the red advancing edge should be painted with a strong iodine solution or even scarified in order to excite a protective leucocytosis and so render the tissues the better able to destroy the advancing streptococci. The infrequency with which these methods are used is the best testimony to their value.

Incisions should not be made in areas of erysipelas either with the idea of preventing its spread or under the mistaken idea that there is pus to let out. The only indication for incisions in erysipelas is extreme oedema such as may occur in the loose cellular tissues of the eyelids or scrotum. Small punctures may be made with a knife to allow the escape of fluid, but as the oedema subsides rapidly as soon as the inflammation begins to diminish this treatment is very rarely called for.

Many methods of treatment, both local and general, have been used for erysipelas, which remains an infection with a low mortality rate, and if left untreated will run its own course and disappear, leaving no ill effects. The treatment outlined above, however, is planned to shorten the course of the disease and add to the comfort of the patient.

Cellulitis

By cellulitis is meant an infective inflammation of the subcutaneous tissues, usually superficial to the deep fascia, though sometimes beneath it. Whereas erysipelas is always a streptococcal infection, cellulitis may be either streptococcal or staphylococcal, and is occasionally due to other organisms. There are several routes by which organisms may gain access to the tissues, but it is most commonly by infection carried in through a punctured wound. The infection may extend rapidly in the cellular tissues and, especially in streptococcal cases, there is likely to be a lymphangitis and lymphadenitis as the result of quick spread by the lymphatics. The treatment of lymphangitis is so much that of the initial cellulitis that they will be considered together.

The treatment of cellulitis is the classical treatment of an inflammatory condition, and may be summarized in absolute rest, heat, and adequate incisions when pus has formed. The first item—rest—is often overlooked, but it is of the greatest importance. When a finger or hand is infected it is essential to splint the part and rest the whole arm, either in a sling or, if the patient is in bed, on a pillow; and it may be added that in the case of a

septic finger, if it is associated with any constitutional symptoms, rest in bed is most important. In treating a leg the patient is kept in bed and the limb is elevated on pillows: if the foot or ankle is concerned a splint holding the ankle at a right angle is called for. It is sometimes quite surprising how cellulitis will cease to spread and the temperature drop as soon as all movement of the affected part is prevented.

There are a number of different ways in which heat may be applied: moist heat in a bath, dry radiant heat, and various forms of fomentations. For a severe cellulitis of the finger or hand the following is an outline of the treatment and the method of applying heat. The patient should be kept strictly in bed from the beginning. Every two hours the hand is immersed in an arm bath of hypertonic saline (5 per cent.) for half an hour, the water being kept at as high a temperature as the patient can tolerate; it is then lifted from the bath, not rubbed but very gently dried by swabbing with wool, placed on a pillow, and given an application of radiant heat. Radiant heat is easily provided by placing the hand under a leg cradle to the top of which an ordinary electric-light bulb is tied. The cradle is then covered with a mackintosh and blanket. Care must be taken not to have the electric bulb too close either to the hand or to the mackintosh, as either may very easily be burned, and the strength of the lamp should not be more than 25 or 40 watts. As the hand is lifted out of the bath and rested on the pillow the fingers and wrist should be kept quite still, and if the patient is inclined to move the hand about when it is on the pillow it should be gently secured to a splint but with the inflamed part left exposed to the heat.

When the leg is concerned it is not always convenient to soak the part in a bath, and the following treatment may be carried out. The whole area involved in the cellulitis is covered with magnesium sulphate paste, which is warmed to body temperature and spread on gauze so as to make it easy to apply. Over the gauze is placed hot antiphlogistine spread on lint, and the whole leg is then wrapped in cotton-wool. The dressing may be changed every twelve or twenty-four hours, when any spread of the cellulitis is noted. Both in the case of the arm and that of the leg it is essential that treatment should not be allowed to interfere with sleep, and the hot baths should be given to the arm only when the patient is awake. The patient should take large quantities of fluid and as much food as he can eat. With a cellulitis there is often great pain, especially when the finger is affected, and this, unless relieved, will do great harm by preventing sleep and thus lowering the patient's resistance. If the pain is bad morphine or dilaudid should be given.

WHEN TO INCISE

There is often a temptation to make early incisions, especially when the area of inflammation is spreading and the temperature is raised; but there is nothing to be gained by incising a cellulitis in the initial stages. It is far better to pursue conservative treatment, for it will be found that many cases of cellulitis will recover without the necessity of making an incision, and thus the convalescence is shortened. But this is not the sole reason for avoiding operation. It is believed, and has been proved, that far from doing good early incisions are likely to do harm. In the first day or two of the inflammation the surrounding tissues are building up barriers of defence, which, if called upon to withstand the added trauma of an incision, are likely to break down and allow the infection to spread further. The only real indication for incising a cellulitis is suppuration, and as soon as pus has formed it should be let out. At this stage the infection has usually become limited, and only good comes from making an incision, provided the latter is confined to the area of the abscess and does not encroach on the surrounding tissues. After the incisions have been made hot arm baths should be continued, but with normal saline at first and then with a gradually increasing strength of salt solution. Care should be taken not to let the part get too sodden, and ten or fifteen minutes' immersion every three hours may be long enough. In the interval between the baths the hand should be covered with gauze and lightly bandaged or wrapped in a sterile towel and given radiant heat for about an hour. After this it should be allowed to lie at rest on a pillow or in an elevated position.

It is sometimes argued that before pus has formed incisions should be made to lower the tension in the tissues, so as to relieve the pain and because the tension is thought to do harm to the tissues. It is far better to diminish the swelling by elevating the limb and giving drugs for the pain. A leg may be supported on pillows or slung from a cradle. The arm is easily held in an elevated position by a roller towel, the upper end of which is suspended from the ceiling or wall, while the arm rests in the lower end, preferably with the elbow flexed and the hand pointing upwards.

Contractures are likely to follow cellulitis overlying a joint—a result all the more to be expected when incisions have been made. This possibility must always be kept in mind, and should be prevented by suitable posture or splints. When cellulitis is severe and of streptococcal origin sulphanilamide may be used as described in the treatment of erysipelas, the same precautions of course being observed.

The above account of the treatment of cellulitis is applicable to that condition in general; there are, however, many important points of difference in the treatment of various parts of the body, but it is not possible to describe all of them here. Nevertheless, reference must be made to one most important point concerning the time for incisions in certain situations. In most parts of the body it is inadvisable to make early incisions in cellulitis, but in the neck it is different. A diffuse cellulitis in this region is quickly followed by oedema of the larynx and pharynx, which, combined with the great tension in the neck, causes suffocation. Incisions must be made early, but if these are only through the skin and subcutaneous tissues they are of no value: the deep fascia must be incised, for in all cases of serious pressure there is tense oedema beneath it. Similarly, when cellulitis affects the orbit or scalp incisions should be made before serious damage is done to the eye or before the blood supply to the outer table of the skull is imperilled.

Lymphangitis

The typical red streaks extending up a limb, indicative of lymphangitis, give some idea of the severity and seriousness of the infection, particularly as regards spread and degree of toxaemia. They are more commonly seen with streptococcal than with staphylococcal lesions, and as a rule begin to fade at the end of thirty-six or forty-eight hours. Lymphangitis of itself requires no treatment, but a careful watch must be kept on the lymphatic glands into which the vessels drain. With the fading of the red streaks these glands, which will have been tender and slightly enlarged, will usually become less tender. But occasionally, instead of resolving, the gland may

remain enlarged and suppuration take place; this may not cause much pain and may therefore be overlooked. Thus whenever pyrexia is continued, although the area of cellulitis is progressing satisfactorily, the lymph glands should be examined, as an abscess may form in them some days or even weeks after the cellulitis has been got well in hand. It is a mistake to incise lymphatic glands before they suppurate: no incision should be made until one is sure from the physical signs that pus is present. When a localized abscess is opened it heals well and quickly, whereas an incision made too early may cause infection to spread further. Hot fomentations for the enlarged glands associated with lymphangitis will do good by hastening resolution or accelerating suppuration as well as by relieving pain.

The course of cellulitis with its associated lymphangitis is greatly altered by appropriate and well-judged treatment. In the aged and those of poor resistance a certain mortality occurs from septicaemia and pyaemia. In all cases there is likely to be some degree of permanent stiffness when the cellulitis is extensive and especially where the fingers are concerned.

SCIENCE AND INDUSTRY

The annual report of the Department of Scientific and Industrial Research[1] opens with a tribute to the late Lord Rutherford and his inspiring leadership during the seven years he was chairman of the Department's Advisory Council. The reports which have appeared annually over his signature during that period all bear testimony to the strength of his conviction that the prosperity of this country can only be assured if its industries make the fullest use of the technique and the discoveries of science. His last act as chairman was the shaping of the present report, which is signed by Lord Riverdale (formerly Sir Arthur Balfour), the new chairman of the Council.

During the year consideration has been given to directions in which it may be possible to strengthen the contacts between industry and the National Physical Laboratory. The report records substantial progress in practically all directions of the Department's work, both in the researches carried out by the research establishments of the Department itself and in the laboratories of the research associations, formed on a co-operative basis in various industries under the Department's auspices.

Storage and Transport of Food

A short time ago a new system of refrigeration was developed at the Ditton Laboratory, known as the "jacket" system. The new system has been installed with modifications in most of the new tonnage in the Australian and New Zealand trade, and during the year arrangements were made for officers of the Department to sail in some of the ships so equipped to examine its practical working. The basis of the investigation had to be wide, since the system involved changes in the method of carriage of all the ships' refrigerated cargoes, including butter, cheese, frozen meat, chilled meat in gas storage, pears, and apples.

The success that has attended the commercial development of gas storage of home-grown apples—that is, storage in an atmosphere containing just the right amount of carbon dioxide—is well known. A second investigation carried out with William pears and with Conference pears has shown that the pear responds to gas storage even better than the apple. When gas-stored the pears ripen more slowly on removal from store, thereby allowing the trade more time for marketing them.

To meet the increasing demands of the trade for information as to the behaviour in store of fruits and vegetables not previously stored in quantity, trials have been carried out with strawberries, hot-house grapes, broccoli, and peas. The previous work with plums has been extended, and gas-storage trials with asparagus have begun.

The Shoe and the Foot

Interesting work has been carried out during the year by the Boot and Shoe Research Association arising from investigations on "walking research" in which moving-picture records are taken of the gait of various people to study in detail the way they walk. The full results of this investigation will not be available for some time. As a result of knowledge already gained, testing machines have been designed for laboratory investigations of the response of different kinds of shoes to the forces acting on them during wear. One of these is a flexibility meter. In dress shoes flexibility gives comfort and elegance, and an instrument, the report states, which imposes on a shoe the correct kind of deflection and gives a measure of flexibility provides a means of investigating the different ways in which this property can be achieved. A second instrument investigates the character of the shank or waist of the shoe, an important feature in high-heeled shoes; and a third, not yet completed, is a machine which will put shoes through the motion of walking and give the soles the treatment they receive during wear. The object of this machine is to give information on the materials and constructions likely to give maximum durability in various circumstances.

Another matter which has come up during the year is occupational footwear—the need for designs and specifications of boots and shoes suitable for various kinds of industrial occupations. For example, what is the best kind of boot or shoe for a waitress to wear, or a nurse, a shop assistant, a policeman, a railway porter, a factory machine minder, and so on. Many large concerns and authorities take a great deal of trouble, and have a high degree of organization, in the welfare of their employees, and doubtless they would not hesitate to specify a certain shoe as part of their employees' uniform if they knew with certainty the best type of shoe for their special circumstances. "Safety boots" for miners and quarry workers is a case in point.

Other Points from the Report

Over half a million clinical thermometers were tested at the National Physical Laboratory during the year and 7,000 thermometers of other types. The Scientific Instrument Research Association has carried out on behalf of a member firm an investigation into the best form of "lensing" of clinical thermometers to enable them to be easily read.

Measurements with the noise-measuring apparatus developed at the National Physical Laboratory have been made on motor vehicles on behalf of a committee of the Ministry of Transport; the results have led the committee to recommend that a noise level of 90 phons should not be exceeded by any new motor vehicle offered for sale or for use on the public highway. Measurements for the Home Office have been made of the loudness of certain portable sound-making instruments intended for use as local alarm signals in connexion with air raid precautions. The Building Research Station is now taking up the problem of ventilation of buildings, and methods and instruments have been developed which will be first used in carrying out ventilation surveys in existing buildings. The extent to which a wall admits or excludes heat and therefore its effect upon the amount of heat required to keep the room warm is being investigated, for different types of wall, in six chambers of 8 feet cube placed side by side with one wall of each facing north. Tests are being made first with three 9-inch solid walls and three cavity walls all of Fletton bricks arranged alternately.

Synthetic resins have been produced which have the property of removing small quantities of materials from water passed through them. The possibilities of using these resins for the removal of boron and fluorine from natural waters is under investigation. Boron to the extent of a few parts per million in water used for irrigation is detrimental to the growth of certain crops. With regard to fluorine, recent surveys in different parts of the world have indicated that fluorine in drinking water to the extent of one part per million causes the dental defect known as mottled enamel.

[1] Cmd. No. 5647. H.M. Stationery Office. (3s.)

Nova et Vetera

SIR HANS SLOANE

Professor W. W. D. Thomson recently delivered a presidential address before the Ulster Medical Society. He took as his subject "Some Aspects of the Life and Times of Sir Hans Sloane," and the text appears in the January number of the *Ulster Medical Journal*. In this address he gives many facts about the great Ulsterman which are but little known. Sloane was of Scottish extraction and his father settled in County Down at the time of the plantation by King James I. He was receiver-general of taxes and was a man of considerable importance. His immediate neighbour was James Hamilton, second Viscount Claneboye and first Earl of Clanbrassil, whose wife brought with her Sarah Hickes to act as companion. Sarah was the daughter of a prebend, said to be of Winchester, who had acted as chaplain to Archbishop Laud, and of this prebend it should be possible to get further details. She married Alexander Sloane, and Hans, their seventh son, was born on April 16, 1660, Hans being a name already known in the Claneboye connexion.

The boy soon showed an interest in science and botany, determining to become a doctor. His father being long dead, he was sent to live with a chemist in Water Lane, Blackfriars, close to the Society of Apothecaries. Here he soon came under the influence of his fellow-countryman, Robert Boyle. In London he haunted the newly founded Physic Garden at Chelsea, becoming the pupil and life-long friend of John Ray, the greatest botanist of his generation. In 1683 he went to France, where he made the acquaintance of the French botanists. On his return he must have brought news of them—though Professor Thomson does not say so—to Robert Morison, the Sherardian Professor of Botany at Oxford, who had once been keeper of the gardens belonging to the Duke of Orleans. On his return to England Sloane was introduced to Sydenham, who took a liking to him and to whose practice he ultimately succeeded. He then spent twenty months in Jamaica as physician to the Duke of Albemarle, then recently appointed governor of the island. In Jamaica he continued his study of botany and married the wealthy widow of a sugar planter. By this time he had become a Fellow of the Royal College of Physicians and a Fellow of the Royal Society, becoming in later years the president of each society. Sloane went from honour to honour, obtained a large and fashionable practice, attended Queen Anne in her last illness, was created a baronet on the accession of King George II, and tactfully led the Princess of Wales (afterwards Queen Caroline) to believe that she had instigated him to have her two daughters engrafted with the smallpox. He died at Chelsea on January 11, 1753, "without the least pain of body, and with a conscious serenity of mind he ended a virtuous and beneficent life."

Sloane had always collected everything that was curious and valuable, and his executors were instructed to offer his treasures to the King for the sum of £20,000. The offer was not accepted, but an Act of Parliament was passed entitled "An Act for the purchase of the Museum or Collection of Sir Hans Sloane, Bart." By this Act £100,000 was ordered to be raised by lottery. The Act passed, the money was raised, the mansion of the Duke of Montague was bought, and the new British Museum was opened for study and public inspection on January 15, 1759, just six years after the death of Sir Hans Sloane. Sloane Street in Chelsea preserves his name, and until recently the greater part of the east side was a market garden. A statue of him stands in the Physic Garden and his tomb is in Chelsea churchyard.

PHILEMON HOLLAND

Through its special numbers, which are always interesting, *Medical Life* deserves well of the profession by bringing vividly before it bio-bibliographical studies, often generously illustrated, of some of the lesser-known characters in the history of medicine. In its July issue Dr. Herbert Silvette of the University of Virginia department of physiology attempts to resurrect the indistinct figure of one who to-day is more familiar to classical students than to physicians.

Philemon Holland, son of a Protestant clergyman, was born at Chelmsford, Essex, in 1552, and was educated at Trinity College, Cambridge, taking his M.A. in 1574. About 1595 he had the M.D. conferred on him, possibly by a Scottish or a foreign university. He practised in Coventry as a physician, and for a time was a schoolmaster. Married for half a century, he had seven sons and three daughters, though only one son survived him. His last years were clouded by poverty and illness, and he died in 1637.

Deeply read in the medical classics, Holland's knowledge of Latin was accurate and profound. He translated Livy in 1600, Pliny in the following year, and Plutarch's *Morals* in 1603. The *Natural History* of Pliny the Elder was for centuries a medical Bible, but in Holland's time its authority was beginning to wane. Only a few years later Sir Kenelm Digby was to be called the very Pliny of the age for lying. Holland's translation, *The Historie of the World. Commonly called, the Naturall Historie of C. Plinius Secundus*, was published in two folio volumes in 1601 and in a revised edition in 1634. It is elegant and ornamental even for an ornamental age. The translator prefers two words to express the meaning of one, often suggesting alternative words to display a single idea in various lights. His imagination was vivid and vigorous, and no man was happier in his style. His notes are brief and few, and probably satisfied his contemporary readers. When he catches Pliny in errors, especially in his accounts of plants and herbs, which he corrects from Theophrastus or Dioscorides or from his own experience, he chides him gently. His medical mistakes, however, he is firm enough in bringing to light. W. R. B.

ALEXANDER SKENE, 1837-1900

Alexander Johnston Chalmers Skene, whose name is familiar to medical students through "Skene's glands" of the female urethra (1880), forms the subject of a sympathetic sketch in the *Long Islander Medical* for September–October, 1937. Born on June 17, 1837, in Scotland, he went to America at the age of 19. Studying medicine at Toronto, the University of Michigan, and the Long Island Cottage Hospital, New York, he took his degree in 1863. After serving in the Civil War he became professor of diseases of women and of clinical obstetrics at the Long Island College, and subsequently dean of the Faculty and president of the College. In 1876 he helped to found the American Gynecological Society. A sound and popular teacher, he wrote numerous textbooks and a novel. Among his hobbies were modelling and sculpturing.

The following theses on British medical men have recently been published by the Institute for the History of Medicine of the Medical Academy at Düsseldorf, of which Professor Wilhelm Haberling is the director: John Hennen and John Pringle, their significance and services in the development of the English Military Sanitary Service, by Lothar Horeyseck; the contribution of Robert Willan and Sir Erasmus Wilson to the development of dermatology, by Hermann Thumm; historical notes on the discovery of anaesthesia with special reference to the work of Henry Hill Hickman, by Kurt Waterman; and William Smellie's contributions to the development of obstetrics, by Fritz Bürger

TREATMENT OF INFANTILE PARALYSIS BY SISTER KENNY'S METHOD

REPORT OF QUEENSLAND COMMISSION

At Queen Mary's Hospital for Children, Carshalton, an experiment in the treatment of anterior poliomyelitis, which has already aroused considerable interest, is in progress. A ward has been set aside at this L.C.C. hospital, and the children there are treated by what is known as the Sister Elizabeth Kenny method, the clinic being organized by Sister Kenny herself. Articles on the treatment of spastic paralysis (*Journal*, August 28, 1937, p. 414) and on the treatment of acute poliomyelitis (January 22, 1938, p. 168), both by Dr. F. H. Mills, who has been collaborating with Sister Kenny, have been published in these columns, together with some comment on this experiment (January 22, p. 178). By courtesy of the Editor of the *Medical Journal of Australia*, Dr. Mervyn Archdall, we have received advance proofs of the issue of that journal for January 29, a large part of which (thirty-six pages) is devoted to the report of the Queensland Royal Commission on Modern Methods for the Treatment of Infantile Paralysis. The Royal Commission, consisting of Drs. Aeneas J. McDonnell, A. E. Paterson, J. V. J. Duhig, J. Bostock, L. J. J. Nye, C. A. Thelander, L. W. N. Gibson, and R. S. Lahz, was set up in October, 1935, to observe cases before, during, and after treatment at Sister Kenny's clinic, and to report thereon.

The Commissioners, in their report, have considered the whole question and have examined and re-examined forty-seven cases treated by Sister Kenny. The periods between the first and the final examination in these cases varied from only five months to about two years. There are several appendices to the report, one of them drawing attention to the first article by F. H. Mills published in the columns of the *British Medical Journal*. The Commission "in no spirit of carping . . . really finds the claims in this article confusing and unsubstantiated, and considers it remarkable that such should be published in a reputable medical journal." The findings of the Royal Commission are summarized, as follows, at the end of its report.

Summary of Findings

"After two years' study of the work of the Elizabeth Kenny Clinic at Brisbane, from the evidence of Miss Kenny and of experts acquainted with her work directly and indirectly, the Commission has arrived at its conclusions on the Kenny method of treating paralysis. For the purpose of convenience we refer to the method of treating infantile and spastic paralysis used by expert medical practitioners as the 'orthodox' treatment, and to that of Miss Kenny as the 'Kenny method.' We have found that:

1. Except in one important principle the Kenny method of treating poliomyelitis differs very little at present from orthodox treatment. Where there is a difference the orthodox method is better.

2. Originally the Kenny method showed radical departure from orthodox treatment, but in the course of time the former has gradually been brought into conformity with the usual medical practice.

3. The departures from orthodox treatment, especially the present important points of difference, could be and actually were responsible for damage beyond and in addition to that already sustained by the patient.

4. Of a series of patients, forty-seven in number, examined by the Commission two years ago and since re-examined at least once and sometimes twice or three times the majority showed no effective improvement; a few were worse and a few improved. Those who became worse would not have done so under orthodox treatment, and those who improved would have done so to an equal or greater extent under orthodox treatment of equivalent intensity.

5. It is significant that in her original forecasts of the patients' chances of cure Miss Kenny was highly optimistic, occasionally to the point of being fanciful. Later she became more cautious. We interpret this inconsistency as a consequence of Miss Kenny's unfamiliarity with the nature of the work she was undertaking and as proof that she learnt as she went along not only caution but orthodox technique as well.

6. The return to the people of Queensland from Government expenditure on account of the Kenny clinics was disproportionately small. The return would have been much greater if the same amount of money had been spent in already existing orthopaedic departments of public hospitals and on vocational training. For many cases of paralysis treated by Miss Kenny nothing further could have been done. The slight improvement in others, of little real use to the patient, involved a waste of time spent in treatment which might have been used to better advantage.

7. The belief held by many people in the possibility of cure and in the reality of improvement by the Kenny method, in spite of facts to the contrary, is attributable to Miss Kenny's strong personality, her own conviction of technical competence, and to improvement in patients treated by her, all of which combined to inspire the patients and relatives with great hope, and especially with unshakable loyalty to Miss Kenny.

8. Miss Kenny may claim credit on two counts. Though she has neither discovered nor applied any new principle, she has drawn attention to the plight of the crippled child, who was too often denied hope of possible further usefulness. Some children suffering from spastic paralysis did improve very much under her treatment, which differed from orthodox treatment only quantitatively. The Commission believes that a trained masseuse can obtain similar results if given the same opportunity of concentrated attention on a given case.

9. Action taken to make effective Miss Kenny's claims was unbalanced. For the most part it was political, without really expert preliminary investigation. Many cripples, beyond further aid, wasted their time and public money in a repetition of treatment (modified in some cases for the worse), the possibilities of which they had already exhausted. The state of affairs was made worse because of Miss Kenny's inadequate knowledge of the conditions and mechanisms amongst which she was to test her theories and assumptions.

10. Miss Kenny's method adds little of value to orthodox treatment and discards principles which sound opinion considers essential. The method of re-education is no better than orthodox treatment; indeed it is faulty, as already stated, and has no advantages that would enable treatment to be efficiently carried out without splints.

11. The Commission cannot recommend the application of the Kenny method to the treatment of cripples at any stage of paralysis, and especially not to the treatment of the acute or early stage.

12. If the Government takes the responsibility of rejecting the advice implied in this report and decides to allow the Kenny clinics to remain, the Commission strongly urges that they be placed under the control of a competent orthopaedic surgeon or surgeons, with the object of rejecting obviously hopeless cases, of avoiding the cruelty of disappointed hopes, of saving public money, and, in general, of getting a sane and balanced view of the patients' possibilities.

13. The Commission also urges that the re-educative care of paralysed or paresed muscles needs a highly trained staff, that attendants at paralysis clinics should receive practical training in anatomy and physiology, and that some adequate standard of general education should be demanded from those undertaking the care of cripples at the clinics.

14. Where no further improvement in the condition of the cripple can reasonably be expected the Commission urges again that attention be directed to vocational training, and especially to the provision of employment.

BIRTH PALSY

Clinically, birth palsy is strictly comparable with poliomyelitis. All references to the re-educative treatment of the latter disease apply exactly to that of birth palsy, with even more stress on the necessity of proper splinting."

Reports of Societies

TREATMENT OF ACUTE STREPTOCOCCAL INFECTIONS WITH SULPHANILAMIDE

In the Section of Surgery of the Royal Society of Medicine on February 2, Professor GREY TURNER presiding, the discussion was on the treatment of acute streptococcal infections by the use of compounds of the sulphanilamide group.

Dr. S. C. DYKE said that as a result of the introduction of drugs of this group there had been a remarkable change in the method of approach to acute infections due to haemolytic streptococci; the outlook in regard to these infections was now more hopeful. The results recorded by Colebrook and his co-workers at Queen Charlotte's left no room for doubt as to the value of the compounds in the treatment of acute haemolytic streptococcal infections. No comparable series of fully controlled clinical observations existed for what might be described as surgical cases, but the success achieved by Colebrook and others was an earnest of what might be expected when this particular method was more widely adopted. The present problem was not so much whether the drug was efficacious as the best method of its employment and the best type of compound to use. The effectiveness of *p*-aminobenzenesulphonamide and its benzyl derivative had now received ample demonstration. Both rapidly diffused in the system and were best given orally. There were available more complex soluble derivatives suitable for parenteral injection. They were effective, but their efficacy was not so well proved as that of the two compounds mentioned. In the present state of knowledge, so long as the oral route was available, it appeared safer to use one of these two compounds.

Sulphaemoglobinaemia

When the drug was first given the bluish-grey appearance shown by patients was disconcerting, but for the most part none of them seemed much the worse for the development of the cyanosis. Sulphaemoglobinaemia was of frequent occurrence, but only of importance when, owing to previous anaemia, an unduly large proportion of the haemoglobin became unavailable to carry oxygen, with resulting anoxaemia. This was readily remedied by blood transfusion, and was not a contraindication to the use of the drug. The incidence of sulphaemoglobinaemia was increased by intestinal fermentation, and therefore by purgation, so that all laxatives, other than liquid paraffin, were best withheld during treatment. Other manifestations seemed to fall mainly under the heading of idiosyncrasy. A recurrent temperature was a phenomenon to be watched for; it might appear from a week to ten days after the administration of the drug. Associated with it was a rash "looking more like measles than measles ever did," the only difference being that it was not associated with conjunctivitis or coryza. Some patients experienced a certain amount of nausea after each dose, but that again was no reason for withholding it. He had seen no toxic manifestations so far as liver and kidneys were concerned. He had given the drug to a number of diabetics suffering from severe generalized metabolic disturbances without any effect on their general condition. He believed the toxic possibilities of the drug had been somewhat exaggerated, always bearing in mind sulphaemoglobinaemia and the locking up of a certain amount of the available haemoglobin.

The tendency was to give too large doses of the drug. The maximum effect in haemolytic streptococcal infections could be obtained by relatively small doses—3 to 4 grammes daily for an adult, with corresponding reduction for children, for not more than a week. If the effect was not obtained within a week it was useless to proceed. If at the end of a week there were signs of improvement then the drug should still be discontinued. The aim was not to destroy the streptococci in the tissues but to sway the balance of the fight. Once this had been done, the tissues could safely be left to deal with the matter, even though active streptococci might still be isolated from the original lesion by cultural methods.

The mode of action of the compounds of the sulphanilamide group remained somewhat obscure. Buttle had shown that in blood *in vitro*, containing its full complement of leucocytes, the drug exercised its full effect; if the leucocytes were removed the effect was very much modified. This led to the supposition that the action of the drug had something to do with the presence of the leucocytes in the blood. There was also evidence that the drug might have a stimulating effect upon the reticulo-endothelial system. This indicated that little could be expected from the application of the drug as a local antiseptic. Experience led him to the conclusion that acute streptococcal infection in its early stages required sulphanilamide and rest, with abstention from the use of the knife for at least ten days.

Judicious Surgery

Mr. P. H. MITCHINER advocated the use of the knife at a considerably earlier stage. Where there was much local tension judicious surgery not only relieved it but permitted the escape of toxins and streptococci which would otherwise be absorbed into the circulation, and by relieving pain ensured rest. In the early stages of septicaemia it was not always certain that the infection was a haemolytic streptococcal one, and thus it was necessary to consider other treatments than prontosil—the only form in which he had used the drug. Excellent as prontosil was in some cases, it was useless in the fatal condition of staphylococcal septicaemia, which, clinically, so closely resembled any other severe septicaemia. Local incision into pus should not be hurried; there should be a certainty of localization of the pus. Maintenance of the fluid intake was important when treating septicaemic patients. Saline was more efficacious than blood transfusion in such cases, and generally should be administered by the subcutaneous, not the intravenous, route. Alcohol was beneficial in cases of severe septic infection.

As to the dosage of the drug, he usually prescribed two 3-gramme tablets on the first and second days, and afterwards, if the temperature had not dropped or the pulse rate remained high, one tablet a day for a week, or until such time as the temperature and pulse rate were normal. Usually the maximum result was obtained in eight days. If the infection did not yield within forty-eight hours to 6 grammes given by mouth it was practically certain that the patient had not a haemolytic streptococcal infection. In suspected cases of staphylococcal septicaemia he gave both prontosil and staphylococcal serum. In cases in which it was not possible to obtain a prompt bacteriological report, or in which prontosil failed to have the desired effect, there was justification for giving either intravenous antiseptics—preferably perchloride of mercury—or serum. Unless there had been general toxaemia serum was in his experience of no benefit in erysipelas, either in checking the spread of the local lesion or in preventing relapses. Lately, however, following the use of prontosil, the vast majority of patients at St. Thomas's suffering from severe erysipelas had been completely cured in from eight to ten days. The results in cellulitis, even haemolytic streptococcal cellulitis, were by no means so satisfactory. The local condition did not improve unless judicious surgery was resorted to at a considerably earlier stage than Dr. Dyke had advocated.

General Discussion

Mr. T. B. LAYTON, speaking of streptococcal infections as a whole, was not prepared to admit that for the first time medicine had a specific and effective remedy against

the haemolytic streptococcus. The haemolytic streptococcus was so constantly the cause of inflammation of the middle-ear cleft that it was quite legitimate to assume that every case arose from a streptococcal infection. If surgeons were to be permitted to see cases only when pus had been well localized and walled off, he feared it would mean going back to the mortality experienced in an earlier era, though he admitted that in cases of meningitis which had been left too long, in which the onset of the disease had become advanced, and in which the physicians had refrained from calling in an otologist at an early stage, prontosil had proved the means of saving a few lives, whereas previously all such cases had been lost. Was it yet proved that the remedy was specific? So far as he could see, prontosil killed the organisms in the blood stream, but did not touch the organisms in a local lesion. If that was so, there was still room for far more surgery than had been indicated by Dr. Dyke.

Miss KENNY, a co-worker with Dr. Colebrook, gave details of the results obtained by the use of prontosil in the treatment of puerperal sepsis at Queen Charlotte's. Established cellulitis did not respond so satisfactorily, but of sixty-seven patients who had been given prontosil not one had developed a cellulitic spread from the uterus, which meant that the duration of illness had been greatly reduced. Professor CLELAND, an Australian pathologist, mentioned a post-mortem observation on a case in which prontosil had been administered, and from which it appeared that the streptococcal infection had been controlled in parts accessible to the drug, but had remained established elsewhere.

Professor PATERSON ROSS referred to the kidney lesion which was sometimes a serious complication in haemolytic streptococcal infection. He wondered whether the high urea content of the blood might indicate not the effect of the recent haemolytic streptococcal infection but rather an older damage to the kidney. Further, was the damage to the kidney permanent, or was function likely to be restored after the acute infection had passed off? In two cases of streptococcal infection with renal damage there was severe colicky abdominal pain. Was that a symptom of the acute infection, or was it particularly associated with renal damage? Mr. E. C. B. BUTLER gave results in a series of cases treated with prontosil at the London Hospital. This revealed definite indications for its administration, but at the same time suggested that it must not be regarded as a panacea. It had definite toxic properties. Mr. CHARLES DONALD expressed surprise at Mr. Mitchiner's advocacy of such early incision. The fluid was really there to deal with the infection, and was, at least in the early stages, beneficial, not necessarily toxic. Dr. G. A. H. BUTTLE said that it appeared that some strains of the staphylococcus were more susceptible to sulphanilamide than others, so that possibly from the point of view of laboratory evidence large doses of the drug might be worth trying if a case was regarded as hopeless from other points of view. In regard to middle-ear infections he had heard from Dr. Massingham of the London Fever Hospital that in cases of scarlet fever, since the giving of about 3 grammes of sulphanilamide a day, there had been no case which had called for mastoid operation.

Professor GREY TURNER said that it would be agreed that the discovery of the compounds of the sulphanilamide group constituted a valuable addition to the therapeutic armamentarium. He had been impressed by the importance of early pain in cases of streptococcal infection. A mild injury if attended by intense pain suggested such a development. No speaker had touched on the prevention of acute streptococcal infections following, for example, street accidents. When dealing with diseases arising from such organisms as haemolytic streptococci it was important to know whether the patient was in a good state of health when the infection occurred. It was a bad prognostic feature if patients with acute streptococcal infection were unable to take nourishment. He wondered what would be the long-term effect of prontosil and similar drugs on sepsis. The organisms persisted in the body when there was no evidence of their activity. As yet there were no effective means of preventing recrudescence of staphylococcal infections. Was health likely to be promoted on these lines by the use of prontosil, or was it only of avail in the immediate illness? Dr. DYKE, in reply, said that despite what Mr. Mitchiner and others had said as to the desirability of early incision in cases of streptococcal infection, he held to his view that the time for the use of the knife was late, not early. As for kidney manifestations in haemolytic streptococcal infections, a large number of patients showed albuminuria and pus in the urine. Colicky pain was sometimes associated with uraemia. Mr. MITCHINER, also in reply, said that he had stressed the necessity that incision should be judicious. He maintained with all deference that in many early cases of streptococcal infection judicious surgery was extremely valuable.

PREVENTION AND TREATMENT OF THE ENTERIC DISEASES

At a meeting of the Fever Hospital Medical Service Group of the Society of Medical Officers of Health on January 28 a discussion took place on the enteric group of diseases, their prevention and treatment. Dr. J. A. H. BRINCKER presided.

Administrative Control

Dr. ANDREW TOPPING (London County Council), in opening, said that under modern conditions water-borne epidemics could not normally occur; when they did they were due to a combination of fortuitous events, frequently unavoidable. Milk and other foodstuffs were much commoner mediums of infection, and until proper control of milk supplies and reasonable facilities for detecting and eliminating carriers were legally enforceable sporadic, and sometimes epidemic, outbreaks would occur. The medical officer of health could do much to prevent any serious outbreak by organization in the non-epidemic periods; if relations with local practitioners were cordial it might be ensured that indefinite febrile illnesses and the possibility of carriers working on farms and in dairies were investigated. Laboratory facilities should be available and used regularly. Investigation should be made as a routine in cases of pyrexia of unknown origin and the like. A great deal could be done to educate the public, who, if they were informed as to the real causes and modes of spread, would be less likely to give way to panic. It must be made plain to them that the causative organisms were not disseminated through the air or lying in wait for people at the street corners. Dr. Topping also sketched the methods of control necessary when cases developed in hospital. In his opinion a contact could not pass on infection during the incubation period, and a realization of this fact would obviate much needless dislocation of hospital practice. As to specific immunological measures, he pointed out that the number of potential sufferers from an infected water supply was so enormous that the cost, the discomfort of the large numbers of people who would undergo injection, as well as the lack of unanimity among immunologists as to the efficacy of the procedure in the presence of infection, might well be held to outweigh the advantages. Passive immunization of those who had been in contact with a case had much more to recommend it.

Improvements in Treatment

Dr. E. W. GOODALL, late medical superintendent in the London Fever Hospital Service, who was to have been the second opener, was unable to be present, but sent a paper dealing with the principal improvements which had taken place in treatment during his long experience. In

his early days heroic methods of hydrotherapy were practised, but he had come to the conclusion that tepid or even warm baths produced equally beneficial effects. He also referred to the insidiousness of the symptoms in many of these cases; he had never convinced himself that it was possible to detect a pre-perforative stage. The greatest advance in the treatment of typhoid, in his opinion, was dietetic—the change from the starvation diet once current to the liberal diet now provided. Serum treatment was not new, and he was not entirely convinced that the claims made for this form of treatment in recent years had been justified. In the past it was his experience that similar results had been obtained with sera and with vaccines, and this made it difficult to ignore the possibility of a non-specific factor.

Immunization

Dr. A. FELIX (Lister Institute) said that in the early days of typhoid serum no animals were available for estimating virulence, but that had now been changed. In diagnosis it was his experience that blood culture was little used in this country as compared with the Continent. With regard to carriers, Vi-agglutination had been noted by him in a large proportion of cases. He believed that a patient might be infectious in the incubation period, with positive blood cultures before the onset of fever. Early use of serum was therefore indicated, both in prevention and in treatment. In the later stages little benefit would be obtained. The prophylactic use of serum was definitely called for, especially in a water-borne epidemic.

Dr. H. S. BANKS (Park Hospital, L.C.C.) said that whenever typhoid cases were sufficient in number to fill a ward in a hospital a high proportion of the nurses on duty became infected unless immunized. It was essential to maintain active immunization of the nursing staffs of fever hospitals, also to provide convenient washing and sanitary arrangements in every ward. In the specific treatment of toxic typhoid fever by Felix's serum he had at first encouraging results, but during the past year results had been disappointing. [Dr. Felix had previously explained that recently the supply of the serum in which he was interested had not always been quite equal to the demand, and on two occasions serum of rather lower antibody content than usual had been issued; on both occasions an experienced user of the serum, unaware of the alteration, had complained to him.] Apart from specific treatment Dr. Banks regarded the modern high-calorie diet in typhoid as the chief advance of the last twenty-five years. It was impracticable as a rule, however, to give a balanced diet of 4,000 calories in the second and third weeks. The diet which he tried at these periods was from 1,600 to 2,300 calories, and it required considerable nursing skill to give even that amount.

General Measures

Dr. ROBERT CRUICKSHANK (L.C.C.) recommended bacteriological examination of the faeces, emulsified in a preservative of 30 per cent. glycerin in 0.6 per cent. saline, as an early diagnostic method suitable to the general practitioner. Dr. J. REID (Motherwell) said that he had listened with interest to Dr. Goodall's observations on perforation. He emphasized the importance of early diagnosis and operation on suspicion. A steady increase in the pulse rate in a patient who complained of sudden abdominal pain within the perforating period was to be taken as sufficient evidence to suggest operation. Delay until characteristic signs of peritonitis were obvious made matters hopeless.

Dr. F. GRUNDY (Luton) said that the control of the enteric infections in non-epidemic times was very largely a question of control of carriers, especially carriers associated with water undertakings, milk supply, and bulk handling of foodstuffs. It might be that the power at present given to the medical officer of health and to the local authority would need to be reviewed in the light of recent happenings to ensure a full control of carriers of epidemic infections. For a reasoned consideration of existing and projected regulations answers to the following questions were desirable: What proportion of a community not recently subjected to any unusual risk were either intermittent or chronic carriers, and of these what proportion had previously suffered from a diagnosed enteric infection? To what extent was the position different in a localized community recently subjected to special risk, and for how long was the difference likely to persist? Further, with regard to water-borne infection, what degree of contamination of a water supply might reasonably be supposed to place a community at risk?

ASSOCIATION OF CLINICAL PATHOLOGISTS

The eleventh annual scientific meeting of the Association of Clinical Pathologists was held at St. George's Hospital, London, on January 29, with Dr. J. BOYCOTT in the chair.

Blood Fragility Tests

The first paper, on blood fragility tests, was read by Dr. E. FF. CREED. Dr. Creed described his technique for estimating the fragility of red blood corpuscles. He found the simplest method of ensuring accuracy in the strength of the sodium chloride solutions was to make up a stock 25 per cent. solution, and prepare dilutions from this when required, using a dropping technique for the final stages. The amount of haemolysis at each dilution was estimated by matching against colour standards, and the results were plotted as a curve. He emphasized the effect of the venosity of the blood on fragility, and showed how discrepancies due to this could be eliminated by aeration of the blood before testing. Fresh untreated blood was used to avoid any risk of altering the fragility by preliminary treatment and to retain the buffering effect of the plasma. He thought that the increased fragility said to be found in some cases of acholuric jaundice only after washing was due possibly to increased liability to changes in *p*H in the absence of plasma. When interpreting fragility results the degree of anaemia had to be taken into account, as the corpuscles of anaemic blood showed an increased resistance to hypotonic saline. He suggested that results should be recorded either as a curve or as the dilutions at which given percentages of corpuscles were haemolysed. He showed the narrow limits within which fragility curves normally fell, and the constancy of these curves in single individuals over long periods.

Dr. C. J. YOUNG then read a paper in which he drew attention to the fact that splenectomy was not always successful in the treatment of acholuric jaundice. Splenectomy and transfusions failed to arrest a haemolytic crisis in one case, but after the removal of a degenerating ovarian teratoma complete recovery ensued. It was suggested that the haemolysis was directly or indirectly related to a toxaemia due to the ovarian tumour, although this could not be the only factor in its causation. Although splenectomy had been recommended to prevent the occurrence of haemolytic crises, it was clear from this and other recorded cases that it could not be guaranteed to do so.

Plasma Bilirubin

Dr. JANET VAUGHAN described observations made in collaboration with Dr. Haslewood on the level of plasma bilirubin in normal and pathological subjects. The values found in 100 healthy men and women, using the method of Haslewood and King (1937), had varied between 0.2 mg. and 1.7 mg. per 100 c.cm., 93 per cent. of the figures falling between 0.2 and 0.8 mg. per 100 c.cm. The high figures had all been noted in men. She concluded that there was no justification for excluding such figures, as previous workers had done, and suggested that until further work was available levels varying between 0 and 1.3 mg. per 100 c.cm. should be considered as probably

normal, while figures between 1.3 and 1.7 mg. per 100 c.cm. should be regarded as probably but not necessarily pathological. In fifteen cases of typical Addisonian pernicious anaemia with red cell counts below 3,500,000 per c.mm. only three patients had been found to have a plasma bilirubin above 1.1 mg. per 100 c.cm.; the average figure was 0.93 mg. per 100 c.cm., which was well within normal limits. She suggested that this divergence from accepted teaching was due to the fact that patients with Addisonian pernicious anaemia now received treatment at an early stage of the disease, before pigment not utilized had had time to accumulate. There was no essential difference in pigment metabolism between Addisonian pernicious anaemia and other megalocytic hyperchromic anaemias reacting to liver. In nine examples of hypochromic anaemia in middle-aged women she had found an average plasma bilirubin of 0.15 mg. per 100 c.cm., with a range of 0 to 1.3 mg. per 100 c.cm. In seven patients with acholuric jaundice, before splenectomy the range had been 0.7 to 2.3 mg. per 100 c.cm.; after splenectomy it always became normal. Dr. Vaughan, in conclusion, suggested that the level of plasma bilirubin was not necessarily a true index of the metabolism of blood pigment, just as the level of serum calcium was not always a true indicator of the normality of calcium metabolism.

Hypochromic Anaemia in Infancy

Dr. H. W. FULLERTON discussed the part played by maternal iron deficiency in the aetiology of the hypochromic anaemia of infancy. Analysis of the haemoglobin levels of 167 mothers and their infants between the ages of 9 and 16 months revealed no significant correlation between maternal anaemia and anaemia in the offspring. This finding did not support the view generally held that the infants of mothers suffering from iron deficiency have a normal haemoglobin level at birth, but develop hypochromic anaemia towards the end of the first year of life, owing to a deficiency in the iron stores in the liver at birth. A quantitative study revealed that even complete absence of liver stores of iron at birth could produce only a mild degree of anaemia in the infant after nine months. It was concluded that low birth weight was a much more important factor in the development of hypochromic anaemia in infancy. Dr. Fullerton also described three cases of severe macrocytic anaemia of obscure causation, one of which was associated with portal cirrhosis. The macrocytosis, he said, could not be attributed solely to a lack of storage of the anti-anaemic factor in a diseased liver. A depressant effect on the bone marrow of toxic products formed or retained as a result of liver failure was considered to be a possible cause, however. It was suggested that in those cases in which a partial response to parenteral liver therapy occurred, deficiency of the anti-anaemic factor might also exist, due either to a failure in production of "intrinsic factor," resulting from the gastro-enteritis which frequently precedes and accompanies liver cirrhosis, or to a failure in absorption of the anti-anaemic factor consequent on congestion in the portal circulation.

Anaemias and Tropical Diseases

Dr. N. HAMILTON FAIRLEY said that though in the deficiency anaemias the reticulocyte response to replacement therapy had been carefully studied, little had been done in the anaemias caused by bacteria and parasites. Tropical diseases afforded scope for such investigation. In malaria, following experimental infection, a haemolytic normocytic anaemia rapidly developed. After atebrin or quinine had been administered the temperature became normal and parasites disappeared from the peripheral blood; in six to nine days a maximal reticulocytosis ensued and was associated with blood regeneration. A fall from 5,500,000 to 4,000,000 erythrocytes per c.mm. might be succeeded by a maximal reticulocytosis of 8 or 9 per cent. In chronic malaria a similar phenomenon occurred, the reticulocytosis being inversely related to the red cell count; here the red marrow was already hypertrophied and the reticulocytes somewhat increased before treatment had started. In blackwater fever an intense reticulocytosis followed intravascular haemolysis; anoxaemia consequent on blood destruction was the main factor involved. In amoebic liver abscess associated with mild degrees of anaemia, emetine injections caused the disappearance of fever, and a maximal reticulocytosis was noted some seven to ten days later. When there was secondary coccal infection such effects were not seen. Here a reticulocytosis persisted for many weeks, only disappearing with recovery. It appeared that malarial and amoebic parasites inhibited the erythroblastic response in both these diseases, acting either directly on the normoblast and preventing adequate reticulocyte formation, or indirectly by decreasing the availability of factors essential to normal haemopoiesis. Graphs showing the reticulocyte response in tropical sprue following the oral administration of liver extract and campolon were demonstrated, also the submaximal response and poor blood regeneration in cases treated by marmite and ventriculin, neither of which proved satisfactory. The more refined and concentrated liver preparations—anahaemin (Dakin and West fraction) and reticulogen (Cohn fraction)—gave lower maximal responses, and had to be given in relatively much larger doses than in Addisonian anaemia to be effective.

Blood Tests in Disputed Paternity

Dr. JOHN C. THOMAS read a paper on the blood grouping test in disputed paternity. After discussing the results of the test in nearly 10,000 cases abroad, he showed that if the test was used as a routine in England approximately 1,000 men who are involved in affiliation suits each year would be proved not guilty. In view of impending legislation it was necessary to standardize the technique of the test to ensure accurate and comparable results, and he outlined a routine grouping method, discussing the possible sources of error. He emphasized the absolute necessity for complete control tests of both the specificity and the potency of the sera, especially with the anti-A and the immune anti-M and N sera. The sera must be of known high titre, he said, and should be titrated at intervals; they should not be stored in capillary tubes. Weak sera often failed to detect the A2 agglutinogen, especially in group A2B, and anti-N sera might be so weak as not to react with MN groups; it also often failed to react with the N2 factor. The use of a too strong cell suspension was a common source of error; no suspension stronger than 1 per cent. should be used. The test should never be performed at a temperature lower than 20° C., and might be done in tubes or on slides; titrations had always to be done in tubes. In either method a negative reading was only made after microscopical examination. If completely typical reactions were not obtained with the unknown and all the control cells, the test had to be repeated with fresh sera, at least three of each type being necessary. The cells should be tested always with two or three anti-M and anti-N sera. In all forensic blood groupings the serum agglutinins were examined as a check on the cell tests, and this was done preferably by titration. Only when there was a reciprocal relationship between the cell and serum tests could the results justifiably be taken into a court of law.

ENDOCRINE TREATMENT OF CRYPTORCHIDISM

At a meeting of the Liverpool Medical Institution on Thursday, January 27, with the president, Dr. E. G. BARK, in the chair, Mr. PHILIP HAWE read a paper on the treatment of undescended testis.

Mr. Hawe referred to the various dangers to which patients with undescended testis are liable, and to avoid which treatment may be necessary. He briefly reviewed the following subjects: (1) the possibility of spontaneous late descent: although in the past this has been thought unlikely after the age of 3, recent statistics support the

view that in about four cases out of five the testis descends spontaneously by the age of puberty; (2) possible disadvantages of delayed descent with reference to atrophy and interference with function after puberty; and (3) development of the treatment by hormones and a comparison of the results published in the literature and those of a series of personal cases. The disadvantages and dangers of the treatment were emphasized. The speaker then made brief reference to operative procedures, and came to the following conclusions: (1) Pregnyl is of value in the treatment of undescended testis: a proportion of cases which would otherwise require surgical treatment respond to injection therapy. (2) In those cases associated with hernia and hydrocele, in which hormone treatment usually fails to secure descent of the testis, a preliminary course of injections is of value, leading to increase in the size and vascularity of the testis and development of the scrotum, and thereby improving the prospects of operation. As a post-operative measure injections are of value. (3) In bilateral cases hormone treatment should be begun about the age of 6 years, except in minor degrees of the deformity. Unilateral cases require individual consideration. In those cases needing surgical intervention the Ombredanne and Thorek methods are recommended.

In the discussion which followed the PRESIDENT said he thought that many years must elapse before the dangers of over-stimulation by sexual hormones in growing children could be correctly assessed. Mr. COSBIE ROSS surveyed the results of endocrine therapy in these cases. He pointed out that this method had been used for a longer period in some American hospitals, and quoted Campbell as saying that while congestive enlargement of the testicle and full descent might occur as a result of a course of injections, in many of these cases the testicle had returned to its former site and had resumed its previous size a few months later. These observations would appear to indicate that hormone therapy should be used as an adjuvant to surgical measures, and Mr. Ross considered that the optimum time for operation was when the hormone therapy had achieved its maximal effect. The importance of operative correction of bilateral cases was emphasized by Moore's experimental work, when the normal descended testicle of an animal was transplanted back into the abdomen and some time later was shown to have lost the power of spermatogenesis. This was due to the increased temperature in the abdomen, and it emphasized the important thermal function of the scrotum, which acted as a "testicular radiator." With regard to the age at which operation should be carried out, the speaker thought that this should be done in bilateral cases before the age of 8 years. During the eighth and ninth years of age pubertal changes were already in progress, and if the full physiological effect of the operation was to be obtained it should be carried out before these changes began. In unilateral cases he was prepared to wait until puberty. Finally, Mr. Ross said that the whole question of the treatment of undescended testicle was overshadowed by the hernia which was present in the majority of cases. Neither endocrine therapy nor procrastination was justifiable when the condition was complicated by the presence of a hernia. Dr. JOHN D. HAY asked if the increased virilism and enlargement of genitals produced in some of the cases by injections of pregnyl persisted after the cessation of the injections.

Dr. A. G. C. FFOLLIOTT described two cases: first, that of a boy with undescended testis high up in the left inguinal canal, which descended spontaneously at the age of 18; and, secondly, the case of a boy aged 7 with bilateral undescended testis high up in the inguinal canal, with marked symptoms of dystrophia adiposo-genitalis, which responded to a course of pregnyl injections given twice weekly. The left testicle descended after the sixth injection, and the right after the tenth.

Mr. W. A. THOMPSON believed that the treatment of undescended testis was of such importance that closer observation and more careful records should be made by those who dealt with the condition in large numbers. He had seen over 400 cases, and had operated on 271. In his cases the following points were observed: (1) one in nine was bilateral; (2) 40 per cent. descended of their own accord, and this descent occurred during the first 2 years of age in 5 per cent., from 2 to 5 years in 10 per cent., from 5 to 10 years in over 15 per cent., and from 10 years onwards in under 10 per cent.; (3) hernia was found to be associated in only 35 per cent. of cases; and (4) it appeared that torsion was not seen so often now as formerly, this being possibly due to the fact that these cases were under supervision and that pain in an undescended testicle was regarded as a partial torsion and an indication for operation. The presence of a hernia also called for operation. Mr. Thompson said his practice now was to operate at 10 years of age, thus permitting a third of the cases to descend and, in the others, anticipating the physical and physiological changes of puberty. Regarding the results of operation, over two-thirds were uniformly good clinically. In 10 per cent. the testicle had to be removed; in 10 per cent. it atrophied. The rest of the results could only be described as moderate. He had been disappointed and frightened at the results of pregnyl injections, which appeared to require serious consideration as to the future state of the patient.

At the same meeting Mr. BRYAN WILLIAMS read a paper on a series of cases of stillbirth and neonatal death.

PAGET'S DISEASE

At a meeting of the Southern Medical Society of Glasgow on January 27, Dr. JAMES F. BRAILSFORD discussed the frequency, diagnosis, complications, and treatment of Paget's disease of bone.

Dr. Brailsford said that Paget's picture of the clinical features of the disease, as he first described it in 1876, was so complete that but little had been added to it since that time. He analysed his findings in 154 cases, of which eighty-two were males and seventy-two females. The youngest patient was aged 27 and the oldest 87. Only one patient fell in the age-group between 20 and 30, there were five between the ages of 30 and 40, twenty-four between 40 and 50, fifty-three between 50 and 60, fifty-three between 60 and 70, thirteen between 70 and 80, and five were over 80. The site at which the disease was first discovered was the pelvis in fifty-eight cases, the tibia in thirty-seven, the femur in twenty-two, the head in thirteen, the spine in thirteen, the humerus in eight, and the os calcis in three. Fractures of the tibia were noted in seven cases, of the femur in eight, of the humerus in five, and of the pelvis in three—that is, twenty-three cases in all. Malignant changes were observed in only six patients, in two affecting the pelvis, and in the remaining four the tibia, femur, scapula, and spine respectively. In most cases the condition was discovered accidentally during radiographic examination of the spine or pelvis in patients who were complaining of pain or discomfort or who were suffering from a spontaneous fracture. Only patients with a bowed tibia were clinically suspect. The bones affected were expanded and plastic, and the lesions seen radiographically were of three types: (1) those exhibiting decalcification, (2) those exhibiting a general increase in density, and (3) those exhibiting fusion and increased density and thickness of the peripheral and main trabeculae in which lanceolate, ovoid, or rounded areas resembling bone cysts were apparent. The disease began either in the endosteal or in the periosteal tissue. In the latter the periosteum appeared to be stripped from the bone by a deposit of osteoid tissue between it and the cortex. Only in that segment of the bone from which the periosteum had been stripped did decalcification and absorption of the original shaft occur. It followed that in the bone which had an intact periosteum the density and structure were normal.

CHILD GUIDANCE

At a meeting of the Sheffield and District Association of the Medical Women's Federation on January 29 Dr. F. J. S. ESHER, medical director of the Sheffield Child Guidance Clinic, gave a lecture on child guidance.

Dr. Esher said that child guidance was a scientific subject based on interpreting certain observations of the relationship between children and parents. Intelligence was a physically determined aspect of mind and depended on the number, complexity, and arrangement of nerve cells. An index of the degree of intelligence could be obtained by testing and was unalterable except for the worse. Mental stability might also be a physically determined aspect of mind, but emotional development or personality was mainly dependent on the psychological environment. Environmental factors might cause a child to become a "problem child" where, for example, there was loss of security in a home broken by discord, death, changes of abode or changes of income; lack of opportunity for mental growth; and, perhaps most important of all, the failure of parents to adopt the right attitude in training a child. Treatment undertaken at the child guidance clinics involved testing of the intelligence by a psychologist, examination of the emotional reactions by a psychiatrist, and certain social investigations which were made by social workers. Conditions of which complaint was commonly made were fears and anxieties, excessive fantasy, emotional instability, nervousness, inferiority feelings, enuresis, neurotic illnesses such as asthma and migraine, delinquency, educational difficulties, and stammering. Dr. Esher concluded by saying that ideally there should never be a problem child. This ideal state would only be brought about by dissemination of the knowledge gained about the mental life of the child in relation to his parents, teachers, and others.

At a meeting of the Section of Pathology of the Royal Academy of Medicine in Ireland on January 21, with the president, Dr. G. C. DOCKERAY, in the chair, four short communications were presented. Dr. W. R. F. COLLIS read notes on a case of congenital haemolytic anaemia, Professor J. MCGRATH described a case of leuco-erythroblastic anaemia, Dr. J. A. WALLACE discussed a case of mediastinal tumour, and Mr. A. B. CLERY showed four specimens of meningeal tumours, outlining the histories of the patients concerned and describing the operations performed in each case. Among those who took part in the discussion which followed each paper were the President of the Academy, Dr. A. R. Parsons, Mr. A. A. McConnell, Drs. J. C. Flood, R. E. Steen, E. Harvey, and T. A. Bouchier-Hayes.

At a joint meeting of the Society of Public Analysts and Other Analytical Chemists with the Food Group of the Society of Chemical Industry, on February 2, Dr. A. C. FRAZER read a paper on fat absorption and metabolism, in which he presented evidence that passage of fats through the walls of the small intestine could take place without hydrolysis to fatty acids and glycerol. In cats such hydrolysis could not occur, for there was no lipase in the intestines. In human beings lipase was present, and part of the fats ingested penetrated the intestinal walls as fatty acids, but a large proportion penetrated unchanged. The fatty acid portion passed to the fat depots by way of the portal vein, liver, and hepatic vein, but the unhydrolysed fat avoided the liver and passed to the fat depots by way of the lacteal lymphatics and the systemic vessels. The presence of particles of unhydrolysed fat in the blood was detected microscopically by use of dark-ground illumination, and this means was used to study variations in the concentration of the fat particles in the blood in course of digestion.

Local News

ENGLAND AND WALES

Liverpool Cancer Inquiry

A commission of leading Liverpool medical men, scientists, and representatives of hospitals has been authorized to report on the work which is being done in the district in the investigation and treatment of cancer, and on possible extensions and improvements. The inquiry was set up on the initiative of Lord Derby, Chancellor of the University of Liverpool, who consulted with the Associated Voluntary Hospitals Board. The members of the commission are Professor Arnold D. McNair, LL.D., Vice-Chancellor of the University (chairman), Professor R. E. Kelly, M.D., F.R.C.S., Professor Henry Cohen, M.D., F.R.C.P., Professor James Chadwick, F.R.S., Professor A. Leyland Robinson, M.D., F.R.C.S., and Mr. Rowland H. Thornton, chairman of the Associated Voluntary Hospitals Board. The secretary is Mr. A. V. J. Hinds, 641, India Buildings, Water Street, Liverpool. The commission's terms of reference are to examine and report on the work being done in the Liverpool area in connexion with the treatment of cancer and the investigation in all its aspects of the cancer problem; to examine and report on methods of extending and if possible improving this work in the Liverpool area and of giving maximum effect to all the scientific, clinical, and financial resources available therein for these purposes, with particular reference to (1) the best use, consistent with the welfare of patients, of the hospital accommodation and research facilities available in the voluntary and municipal hospitals in the Liverpool area, and in particular in the Radium Institute and the Hospital for Cancer; (2) the most promising lines of investigation in regard to cancer, its causes and treatment, capable of being pursued in the area; (3) the feasibility of co-ordinating the various activities involved, whether by bringing these under some unifying board or authority or by some other method.

New Clinic for Chronic Rheumatic Disease

On February 2 the new clinic which has just been formed for the treatment of chronic rheumatic diseases at the West London Hospital was officially opened. The physician-in-charge, Dr. W. S. C. Copeman, showed a film of his own making illustrating the differential diagnosis of rheumatoid arthritis and osteo-arthritis. Among those present were Sir Frank Fox, organizing secretary of the Empire Rheumatism Council, the chairman of the Public Health Committee of the Royal Borough of Kensington, Dr. James Fenton, M.O.H. for Kensington, and Dr. J. B. Howell, M.O.H. for Hammersmith. Before showing the film Dr. Copeman drew attention to the importance of chronic rheumatism as an industrial disease, and expressed his belief that the West London Hospital was the first general hospital in London, if not in the British Isles, to start a special department for the treatment and investigation of these diseases. At the conclusion of the lecture the Dean of the Medical School, Dr. Maurice Shaw, congratulated Dr. Copeman on the excellence of his film, and expressed the general satisfaction of the staff of the hospital in the foresight of the Board of Management in providing the new clinic. Dr. James Fenton stressed the need for research into the rheumatic diseases, and hoped that this aspect would not be lost sight of in the new clinic. A clearer understanding of the aetiology would lead to more effective preventive treatment. Dr. Howell also congratulated the hospital on its new venture, and promised the sympathetic support of the public health authorities of the Borough of Hammersmith.

Chadwick Public Lectures

On Tuesday next, February 15, at 5.15 p.m., the twenty-sixth annual series of Chadwick Public Lectures will be started at Manson House, 26, Portland Place, London, W., when Major P. Blair-Hook of the South African Medical Corps will lecture on "Health Conditions in the Union of South Africa." This will be also the fourth and last lecture of the course by representatives of the Dominions. Sir William J. Collins, M.D., chairman of the Chadwick Trustees, will preside, and Major Blair-Hook will tell in word and picture the health story of the Union of South Africa from days of the early use by trading steamers of the Cape of Good Hope as a refitting station, through all the developments which geographical and race problems have brought about. On March 3 Mr. B. S. Townroe will discourse on "The Hygiene of Prisons," reviewing the Prison Acts from 1782 to 1898, describing present movements for amelioration and plans for future reforms, and giving account from his inspections of the sanitary conditions of many French, American, and English prisons. A series of slides showing interior and exterior conditions will illustrate the lecture. These lectures at Manson House will be followed by two in the theatre of the London School of Hygiene, Keppel Street, W.C., where, on March 24, Mr. W. J. E. Binnie will take "Water Supply in Relation to Public Health" as his subject. In May Professor Ernest Barker will speak on "The Community Centre in Relation to Public Health and Public Welfare." Admission to all Chadwick Lectures is free and no tickets are required.

SCOTLAND

Edinburgh Public Dispensary

At the recent annual general meeting of the Royal Public Dispensary of Edinburgh the Lord Provost, who presided, said that under an agreement with the corporation the old site of this dispensary had been made available for other purposes as part of the slum clearance scheme in the Richmond Street district. A new site and a substantial sum towards the cost of rebuilding had been contributed by the corporation, and the new building, now almost complete, would be opened in spring. The total number of patients treated in the past year had been 2,296, and the finances had been satisfactory with a surplus of revenue over expenditure of £220.

West of Scotland Neuro-Psychiatric Research Institute

At the annual meeting in Glasgow on January 31 of the Board of Management of the West of Scotland Neuro-Psychiatric Research Institute Dr. Ford Robertson, superintendent of the Institute, said that several publications on serology, haematology, and bacteriology in relation to mental diseases were in course of preparation. There had been progress on the Continent in recent years in the treatment of dementia praecox by cardiazol and insulin shock. It had been estimated that if patients suffering from dementia praecox were treated by the insulin shock method during the first four years an average of 46 per cent. recovered, while an even higher percentage of recoveries was claimed in cases receiving the cardiazol shock method of treatment. Research in mental disease in this country, he said, did not enjoy so much support from the public as research into bodily illness.

Aberdeen Health Services

The report by the medical officer of health of the city of Aberdeen on the medical inspection and treatment of school children, covering the year ended July 31, 1937, states that the dental section of the school services scheme continues to increase in popularity, and that the appointment of an additional whole-time dentist has been fully justified. Further additions to the dental staff are envisaged in the near future. During the period under review the authorities have fostered an active campaign in connexion with immunization against diphtheria. A circular letter was sent to the head teacher of each school, together with a supply of handbills, consent cards, and record cards. The teacher was requested to give a handbill and consent card to each child. The handbills, addressed to parents, carried some very effective propaganda in favour of immunization. Those parents who were persuaded by the handbills signed the consent cards to permit immunization, and their names were then entered by the teacher on the record cards. As a result of this campaign 52.3 per cent. of school "entrants" were immunized. This figure, however, is not regarded as satisfactory, for, as stated in a previous report, a percentage of at least 80 is necessary to affect favourably the efforts to eliminate the disease and to relieve the strain on the infectious diseases hospitals.

Correspondence

Use and Abuse of Antiseptics

SIR,—May I reply to comments which have been made both in your columns and in personal correspondence on the articles by Mr. Geoffrey Keynes and myself entitled "The Use and Abuse of Antiseptics"? These have referred chiefly to the properties and use of acriflavine. In the first place, by deploring the cost as well as the unsuitability of iodine we did not intend to convey that all the preferable alternatives are inexpensive; this is true of Harrington's solution but certainly not of acriflavine, although the 0.2 per cent. solution recommended for the treatment of wounds is more economical than Tinker and Sutton's 5 per cent. solution for pre-operative skin disinfection. Professor Fleming's opposition to some of the claims made on behalf of acriflavine is well known, and there is much force in his argument that appropriate experiment should expose leucocytes to the action of acriflavine for a longer period of time. In a study of acridine compounds which has recently been made in this laboratory my colleague, Dr. A. E. Francis, has studied their effect on the motility of leucocytes by direct observation during periods up to one and a half hours, and activity persists in 1 in 2,000 solutions of acriflavine and proflavine throughout this time; the spectacle presented by these leucocytes, stained a bright yellow but nevertheless actively motile, would astonish any sceptic. Since weaker solutions of such compounds are bactericidal under similar conditions and within the same time limits, it is true to say that these substances are more lethal to streptococci than to the cells of mammalian tissues.

Acriflavine has the disadvantage, not referred to in the articles by Mr. Keynes and myself, of ill-defined composition. It is actually a mixture in variable proportions of 2:8 diaminoacridine hydrochloride and its methochloride, together with traces of by-products of the reaction of preparation, which appears to increase solubility. It is possible that experimental results less favourable than those which I have just described have been obtained with unsatisfactory samples, and that divergent opinions on the merits of acriflavine are justified by differences in composition and action. Good acriflavine is the best antiseptic of its kind now obtainable, and it is justifiable to hope that bad samples are not nowadays produced, but the position is admittedly unsatisfactory. A paper by W. H. Linnell, A. Albert, A. E. Francis, and myself, which is shortly to appear, records

an attempt to identify a single acridine compound (as distinct from a mixture) which is at least equal in merit to acriflavine, and although this work has not yet fully attained its aim it is likely that in time to come uniformity of effect in antiseptics of this kind will be secured.

May I at the same time refer to Dr. Corfield's suggestion that chloroform should be used instead of spirit for sterilization of instruments? This may be a useful method from some points of view, but the accompanying statement that chloroform will kill spores requires emphatic contradiction. It was found as long ago as 1881 by Koch that chloroform would not kill anthrax spores in 100 days, and subsequent experiments by many others have had similar results. I can vouch from personal experience for the fact that chloroform does not kill the spores either of *B. subtilis* or of *Cl. tetani*.—I am, etc.,

St. Bartholomew's Hospital, London, E.C.1, Feb. 4. LAWRENCE P. GARROD.

Oxygen Want and Oxygen Therapy

SIR,—Your leading article on this subject contains a statement in regard to the mortality from pneumonia which requires explanation or correction. You state that among 46,000 cases of pneumonia in England and Wales in 1936 there were 30,000 deaths, and contrast these figures unfavourably with those in the United States.

It has long been recognized that the mortality of lobar pneumonia in the United States is, for various reasons, considerably higher than in this country. The usual mortality figure for lobar pneumonia in large hospitals in England, including all age groups, is given as approximately 20 per cent., and it is generally held that the mortality in practice is considerably lower. Full references to mortality figures were recently given by Davies, Graham Hodgson, and Whitby (*Lancet*, 1935, **1**, 791). Your figures suggest a mortality of 65 per cent., or double the higher hospital figures in the United States, or, so far as I know, in any European country. You give no indication, however, as to whether your figures are concerned with lobar (pneumococcal) pneumonia only, or with all types. No allowance is apparently made for discrepancies due to the fact that, although pneumonia is now notifiable, we have no reliable evidence as to the actual proportion of cases notified.

Finally, the article seems to imply that the more favourable [*sic*] figures in the United States may be partly due to a more extensive or efficient employment of oxygen therapy. This would be very difficult to substantiate even were it accepted that the American mortality rate is lower than ours. It must be remembered that serum therapy is extensively employed in the United States because of the high mortality figures there, and that it has not as yet been employed on a wide scale in England.—I am, etc.,

Cambridge, Feb. 5. JOHN A. RYLE.

*** The figures were obtained from the Annual Report (1936, p. 17) to the Minister of Health. The cases include, however, only those that are notifiable; but the deaths tabulated under acute primary and acute influenzal pneumonia (31,067 in all) include also deaths from bronchopneumonia and "pneumonia not otherwise defined," as stated in a footnote. In the leading article the word "notified" should have been inserted between "46,000" and "cases." That early treatment with oxygen is of value in preventing and lessening complications was demonstrated by Dr. Hathaway and colleagues (*Anesthesia and Analgesia*, 1937, **16**, 89), also by Drs. Evans and Durshordwe (ibid., 1932, **11**, 193).

The Danger of the Stercolith

SIR,—Mr. A. M. Spencer in the *Journal* of January 29 (p. 227) stresses the importance of the stercolith in the aetiology of acute appendicitis; undoubtedly its presence, acting as a nidus of infection and as an obstruction to drainage, is responsible for a virulent and acute type of the disease that is apt to be particularly dangerous. Perforation of the appendix wall and release of the stercolith into the abscess cavity is frequently found in late cases, and careful search for and removal of the stercolith should be made as far as circumstances permit. Failure to achieve this may be responsible for prolonged suppuration, either immediate or delayed, as in a recent case under my care.

In 1925 a child of 2½ years was operated on for acute appendicitis; as the patient was extremely ill no prolonged search was made for the stercolith which, it was noted, had probably been present. Healing occurred satisfactorily, and nothing further was noticed until, as a boy of 14, the patient was again seen in 1937 for abdominal pain and tenderness in the right iliac fossa. A few days later a lump appeared, and from this pus was evacuated. While this was being done the stercolith which was suspected as the cause of the residual infection was felt momentarily in the depths of the abscess cavity, but escaped before it could be removed and could not be identified again. Prolonged suppuration followed in the pelvis and lower abdomen, and the boy became extremely emaciated and ill, until, happily, at the end of three months a small stercolith of almost metallic hardness delivered itself from a sinus, and suppuration ceased almost immediately.

Apart from such an unusual occurrence, one may envisage the possibility of mild chronic sepsis occurring round a retained stercolith producing very baffling symptoms in a case in which the appendix was known to have been removed and such a contingency overlooked.—I am, etc.,

Birmingham, Jan. 29. SEYMOUR BARLING.

Bovine Tuberculosis in Britain

SIR,—During a recent visit to Finland I learnt that over two million cows in that country have been tested with tuberculin during the past forty years. In the early years of testing cattle a positive reaction to tuberculin was obtained in as many as 26 per cent. of the animals. Many of these were slaughtered and found to be obviously diseased. In this aspect of public health Finland is now unique in Europe. In the State-controlled abattoirs only 0.02 per cent. of cows slaughtered are found to be tuberculous, as against 50 per cent. in Sweden and at least 40 per cent. in England and Wales.

The facts about bovine tuberculosis in Finland led me to seek information from the Ministry of Health as to the percentage of cows found to be tuberculous when slaughtered (*a*) in municipal abattoirs and (*b*) in private abattoirs in England and Wales. The reply was as follows:

"I am directed by the Minister of Health to say that he regrets that the information you seek is not available, and the Minister is not aware of any source from which it could be obtained at present."

In view of that reply it is a pleasure to enlighten the Minister as to the sources from which the information could be obtained. All abattoirs, municipal and private, are open to sanitary or veterinary inspectors. All owners of private abattoirs must give statutory notice to the local medical officer of health before animals are slaughtered. In a large rural area with only one sanitary or veterinary inspector it would be impossible to supervise all slaughtering. Nevertheless the slaughter of some animals is

supervised, and presumably the results are reported to the medical officer of health. Presumably, also, these results are incorporated in his annual report, of which three copies are sent to the Minister of Health. Moreover, in the city of London, and probably in other large cities, all slaughtering is supervised by two whole-time qualified veterinary inspectors. Is there any difficulty in asking for a return of the number of carcasses inspected and the number found to be tuberculous? The answer is in the negative.

The Cattle Diseases Committee of the Economic Advisory Council, which was appointed in November, 1932, and whose report was published in May, 1934, stated as follows concerning the incidence of bovine tuberculosis among cattle (para. 29 of the report):

"The incidence of bovine tuberculosis among cattle is probably as high in Great Britain as anywhere else in the world. A number of witnesses before us have expressed the view that 40 per cent. of the cattle in this country are infected with it in such degree that they will react to the tuberculin test. This estimate is based first upon the percentage infection found in herds tested with tuberculin for the first time, and, secondly, upon the results of the inspection of carcasses of cows slaughtered. For example, the results of tests in 144 herds which had not previously been tested for tuberculosis were quoted in various memoranda submitted to us, and showed that of 5,199 cows, 2,233, or 43 per cent., gave a 'positive' reaction. It was also recorded in a report drawn up by the People's League of Health that 39.5 per cent. of 55,318 cows slaughtered at various centres were found on post-mortem to be infected. In considering this latter percentage it must be remembered that many cows which are infected with tuberculosis do not reach the slaughter-house, as they die upon the farm, or are sent to kennels or knackers. It may therefore be unduly low. In the light of such figures as these the generally accepted conclusion that at least 40 per cent. of cows in dairy herds are infected with tuberculosis does not appear exaggerated. This percentage of infection may be compared with the percentage of something over 4 in the United States, and of approximately 12 in Canada, before steps were taken against the disease. We have no evidence to show whether the disease is increasing or diminishing in Great Britain, but the widespread neglect of adequate precautions against its increase makes the latter improbable."

It is a sad reflection on our complacence and apathy that Great Britain in this aspect of public health should lag so far behind a smaller and poorer country, and that the incidence of bovine tuberculosis in England and Wales should be two thousand times greater than in Finland. To make things worse our Milk Marketing Board, the most friendless body in Britain, has put a levy on the milk from tuberculin-tested herds. The owners of these herds are allowed to sell milk for one-third more than the price of milk from non-tested herds. Nevertheless there will be a reduction in the number of tuberculin-tested herds, and consequently a reduction in the amount of tubercle-free milk available for the public. When the Milk Scheme was introduced all milk producers—good, bad, and indifferent—were lumped together and paid the same levy. The good producer who spent more on milk production than the bad producer would have been crippled, if not ruined, by the levy. To escape from the clutches of the Milk Board the good producer sold his herd and bought tuberculin-tested animals which cost double as much as untested cows. Yet being outside the jurisdiction of the Milk Board he was able to sell his milk at a remunerative price, and in point of fact the number of tuberculin-tested herds was doubled. I know of two owners who have ceased to use the tuberculin test since the levy was introduced.

The Milk Marketing Board is a mystery and a sign. The producer must sell whole milk for 2s. a gallon, but he may sell skimmed milk to food manufacturers for 3½d. a gallon. Again, milk sold for its cream costs more than milk sold for making butter, although a child could tell you that butter is made from cream. Hence we have reached the Gilbertian situation where it is more economical for a consumer of cream to buy butter together with a machine for turning the butter back into cream. It reads like *Alice in Wonderland*, or rather in Dementia. I am not an economist, and am beginning to wonder whether such people exist.—I am, etc.,

London, W.8, Feb. 3. HALLIDAY SUTHERLAND.

Tuberculosis in Infants

SIR,—The prevention, diagnosis, and treatment of intrathoracic tuberculosis in infancy is one of the most difficult problems we have to face. Dr. Dorothy Price's excellent paper on tuberculosis in infants (*Journal*, February 5, p. 275) will help to correct certain common misconceptions to which she refers and emphasize important points in prognosis and treatment. It might be argued that her diagnostic standards were not strict enough, and I for one would wish her to include, in paragraph 3 of her summary, examination of the expectoration (obtained by tickling the throat or by gastric lavage) for the tubercle bacillus either directly or, if this is negative, by guinea-pig injection. Exact diagnosis is particularly important, because it helps the tuberculosis officers to find unsuspected "open" cases of phthisis in adults, and, as Dr. Price emphasizes, one of our most important tasks is to remove infants from their dangerous environment whenever we can and at the earliest possible moment. It would, of course, be more economical to remove the infected adult from the home—in the American phrase to "make every home a preventorium"—but for various reasons this is often impossible at present.

My own investigations—a summary of which will shortly appear in *Acta Paediatrica*—have convinced me that:

1. Primary intrathoracic tuberculous infection is fairly common in infancy, and is frequently undiagnosed—masquerading as bronchitis, pneumonia, debility, "marasmus," gastro-enteritis, etc.—unless the tests advocated by Dr. Price and supplemented by a search for the tubercle bacillus are extensively applied to ailing babies.

2. Such infection is always a potentially dangerous illness, but the mortality rate is not high if infants can be removed early from the source of infection. (Dr. Price's series gave a high mortality rate because so many of her cases had gone beyond the primary stage when they came under her care.)

3. The correct and early diagnosis of primary tuberculosis in infants constitutes one of the most important means we have for attacking the tuberculosis problem in general.—I am, etc.,

Liverpool, Feb. 6. NORMAN B. CAPON.

Trauma and Progressive Muscular Atrophy

SIR,—In his interesting review (*Journal*, January 29, p. 225) Dr. G. E. Frederick Sutton puts forward the view that trauma may sometimes be a factor in the production of progressive muscular atrophy. It may be of interest to mention three cases, of a somewhat different kind, which perhaps throw a light on the nature of the influences at work.

During a large epidemic of acute anterior poliomyelitis I saw three instances of children suffering from fractures who developed poliomyelitis while the fractured limb was still in splints. In each of the three cases there was a widespread paresis, which cleared up almost completely

except in the fractured limb, which remained severely and permanently paralysed. For example, in a case of fracture of the bones of the forearm the final result in the uninjured limb showed a paralysis of only the opponens pollicis and triceps, while the whole of the fractured limb was the subject of permanent and almost complete paralysis, which included even the deltoid. I described these three cases at a professional meeting, and in the subsequent discussion it transpired that two of the members present had seen cases precisely comparable. In these children it appears probable that the trauma had the effect of opening the door to an acute anterior poliomyelitis, with a segmental distribution corresponding to the site of the injury. The pathological process is at present obscure, but it may perhaps represent the acute phase of the chronic process described by Dr. Sutton.—I am, etc.,

R. G. ABERCROMBIE.

Edgar Allen Institute, Sheffield, Feb. 3.

SIR,—I was greatly interested in Dr. G. E. F. Sutton's account of the association between trauma and progressive muscular atrophy. During 1937 I was consulted four times in respect of this problem. On each occasion I gave those seeking my advice the following information. (*a*) There is a sharp conflict of opinion, as reflected in medical textbooks, on this subject. The best example of this conflict is seen in the difference between the second and the fourth editions of Price's *Textbook of Medicine*. (*b*) It is incredible that slight jarring or jolting should be the cause of progressive muscular atrophy; for if it were so the disease would be exceedingly common instead of very rare. (*c*) On the other hand, many patients give an impressive chronological account pointing to the probability that in certain cases trauma may hasten or precipitate the onset of the disease. (*d*) It may well be that in certain cases the accident is the result of clumsiness in the very early stages of the disease. (*e*) The disease may be closely mimicked by other maladies, some of which are certainly traumatic in origin. (*f*) The original descriptions of the malady by Duchenne and others make little or no mention of trauma.

I thought it might interest your readers to know how these views have appealed to jurists. Two of my cases are still unsettled. In one case compensation has been refused point-blank, and I have advised that appeal will be useless. In a fourth case the employers paid to the estate of the injured workman the sum of £500. A learned and very experienced county court judge consented to this settlement.—I am, etc.,

Sunderland, Feb. 3. G. F. WALKER, M.D., M.R.C.P.

SIR,—The association of trauma with progressive muscular atrophy was discussed in an article by Dr. G. E. Frederick Sutton in the *Journal* of January 29 (p. 225), and I am prompted to add the following case report to the somewhat scanty literature on the subject.

A retired business man, aged 62, sprained his right ankle while playing golf in September, 1935. In December of the same year he complained of numbness and weakness of the right foot and leg, which he attributed to the recent accident. A month later, in January, 1936, the question of progressive muscular atrophy was raised, and by April of that year the diagnosis was established. In October atrophy of all the muscles below the knee was demonstrable, but the patient was able to walk and to drive his car with safety. A year later, in October, 1937, he was still driving, but was unable to walk without the help of a stick, and could not balance himself unassisted when standing. He further complained of weakness and cramp of the muscles of the left thumb, being unable to hold his razor in that hand. The following month the loss of power in the left arm interfered with gear-changing while driving, and weakness of the left foot was first noticed. A month later the trouble spread to the right hand, and at the time of writing there is pronounced general weakness of all four limbs. The patient's condition is complicated by urethral stricture and multiple urinary calculi. The Wassermann reaction is negative.

The question arises as to the relation between the slight injury to the foot and the onset of the disease a few months later. *Post hoc ergo propter hoc* may be fallacious reasoning in this case, and the accident to the foot may have been the first sign of muscular imbalance. The patient himself insists that his foot was perfectly sound before the accident, and that it has never been the same since. He unhesitatingly attributes his disability to that occurrence. But it is a well-recognized fact that any patient suffering from a defect—be it physical, mental, or moral—seeks an external cause rather than admit in himself an internal source of disease. Every woman with mammary carcinoma believes her condition to be due to a blow upon the breast.

I report this case for what it is worth. While some may consider it as a further instance of trauma precipitating the onset of progressive muscular atrophy, I am inclined to look upon the relationship as accidental. Having regard to the large number of injuries and the few cases of progressive muscular atrophy, it is by no means certain that the cases hitherto reported cannot equally well be explained as mere coincidences. In the absence of any better theory than "ascending neuritis" or "molecular disturbance of the cord" I prefer to retain an open mind on the subject.—I am, etc.,

D. STANLEY-JONES, M.B., B.S., B.Sc., F.R.C.S.

Hayle, Cornwall, Jan. 31.

Acute Appendicitis

SIR,—After reading Dr. A. M. Spencer's article in the issue of January 29 (p. 227) on the aetiology of acute appendicitis, I feel that two criticisms of it must be raised. The first of these is this—that during the years up to 1900 (*circa*) appendicitis was frequently labelled in error typhlitis, perityphlitis, or simply peritonitis of unknown origin, and therefore these diseases should be included in any survey designed to determine its frequency prior to that date. The second is that it is fallacious to base statistical conclusions on any series of cases which is not considerably larger than that used in this article. Let me illustrate the point by an example showing the possible error even in a fairly large series and extracting only one simple fact. During 1936, 319 cases of catarrhal appendicitis were operated on in the Western Infirmary, Glasgow, with three deaths, giving a mortality rate for the year of slightly under 1 per cent. If this series of cases is arranged chronologically and split into two groups of 160 and 159 respectively, it is found that the former contains no deaths, while the latter contains all three and thus acquires a high mortality rate of slightly under 2 per cent.

Since the only justification for destructive criticism is the emission of constructive suggestion from the same source, let me make the following suggestions to Dr. Spencer for his future use in the study of this subject. I would suggest first of all that he makes an endeavour to correlate the organisms of the sore throat—when present—with those in the inflamed appendix; secondly, that he differentiates between the appendix kinked over an adhesion with distal inflammation and that coiled on itself

through intramural tension; and, thirdly, that he might investigate thoroughly the bacteriology of the acute fulminating appendicitis which is so often fatal, particularly with reference to the leucocytic response and the value of the sulphanilamide group of drugs in its treatment. It is generally admitted that the diet of the white races plays a large part in their marked predisposition to the disease, and the extreme prevalence of appendicitis in the U.S.A. suggests that canned and preserved foods may be largely responsible for this increased frequency. This last point also seems worthy of further investigation. The results of such investigations made over a large series of cases—500 to 1,000—could not fail to be of great clinical value.—I am, etc.,

Glasgow, Feb. 5. A. IAN L. MAITLAND, F.R.C.S.Ed.

Throat Carriers in Midwifery Practice

SIR,—The "generous spirit" that recognizes in Professor Miles H. Phillips's dictum, "every woman is pregnant until you have proved that she is not," a pearl of wisdom when applied to bacteriology finds that "what you lose on the swings you gain on the swabs." It is therefore a matter of interest and importance to estimate what the profession has gained on the swabs. The swabs have revealed to us, among other things, that the streptococcus is a most protean and omnipresent organism. The type lethal to man is found in every possible situation except one—the vagina. It refuses absolutely to inhabit the vagina until it can clearly prove that it has been put there by the carelessness of the medical attendant. I know of no other organism that displays this lethal and malicious combination of characteristics. The favourite habitat of this Group A streptococcus is the nose and throat of every third or fourth person in existence. It shows such a tendency to inhabit the vagina of the parturient—when the attendant can be convicted—that it is almost impossible to keep it from doing so.

The remedies suggested are, among others, that the nose and throat of the patient and every possible contact should be swabbed *two days before the patient goes into labour*. With a certain Royal example recently before us, it is pertinent to ask how often these suffering people would require to have their throats swabbed. The swab must be taken and cultured by experts, otherwise the results are not to be depended on. If a swab is negative no importance is to be attached to it. If positive the swabs have to be kept for six months in case of legal action. They have to be witnessed and certified by disinterested responsible persons, who no doubt in their turn would require to be swabbed and masked. Similarly, two days before labour sets in everyone in the immediate environment of the patient must be constantly masked, as must the patient herself. The same masks must not be worn for any length of time because they lose their pristine sterility and become in their turn lethal agents. To be absolutely reassured against legal consequence we must also have swabs taken to prove that the masks were sterile, and if the masks were sterile the swab would thus be negative, and the bacteriologist says these negative swabs have to be disregarded. We must thus go on swabbing at the sterile mask until we get a positive culture, and that positive culture must also be kept for six months. To show the resulting reaction by the parturient if these bacteriological safeguards are not employed we have only to conjure up a picture of the postman with septic tonsils coughing upon letters congratulating the young primipara on the successful conclusion of her first adventure. The letters would be taken straight to the patient with disastrous bacteriological results. The nurse who carried the correspondence to the patient would become similarly infected, and upon the swabs being taken would be blamed for the septic consequences to the patient. The doctor and nurse in the future must be content to have their antra operated on, tonsillectomy performed, etc., though no one with a knowledge of the end-results of these operations would seek to maintain that they were cures for streptococcal infection. I need not enlarge these points further, but will end by asking again—What *have* we gained on the swabs?—I am, etc.,

Glasgow, Feb. 4. JAMES COOK.

Cauterization of the Cervix

SIR,—I should like to add my congratulations to those of others on Professor James Young's able and enlightening publication on lower abdominal pains of cervical origin in the *Journal* of January 15 (p. 105). The amount of disability resulting from chronic septic infection of the cervix uteri is not sufficiently recognized, and it is a good thing to call attention to it from time to time because the condition has been overlooked in so many women who come to the gynaecologist after having found no relief from removal of the appendix. It is to one of the methods of cure that I wish to call attention.

Thorough cauterization is often advised and referred to as a simple and harmless measure. I have recently seen three most distressing results of this procedure. One case was that of a young woman who developed increasingly severe dysmenorrhoea after cauterization. All that remained of the cervix was a hard indurated knob of dense scar tissue or keloid through which the smallest dilator would pass with difficulty; dilatation of the canal was impossible. How is such a patient to be relieved? The other two cases are more or less the same but less severe. Both have hard cicatrized tissue preventing the natural softening and dilatation of the canal, and have developed dysmenorrhoea since cauterization. The essential practical features of the cervix are its elasticity and dilatability. The scar of a burn is a permanent deformity which the obstetrically minded do not like in the cervix, apart from the occasional results seen from over-thorough cauterization.

I think there are objections to producing burn scars as a surgical procedure. I find that the clinical results of disinfecting the glands of the cervical canal as much as possible, coupled with curetting and excising badly infected portions and retention cysts, and with amputation of the cervix for the more severe cases, are satisfactory. So far I have not seen constrictions of the canal and dysmenorrhoea resulting. My warning is not to those who understand the correct degree of heat to use and how to apply it, but to those who would give it "a thorough good cauterizing"—and do. Is my experience exceptional?—I am, etc.,

E. LAWTON MOSS, F.C.O.G., M.R.C.S.

London, W.1, Jan. 30.

Methods of Pelvimetry

SIR,—The important conclusion arrived at by Mr. J. Howkins in his paper published in the *Journal* of February 5 (p. 278) on the unreliability of the clinical measurements of the true conjugate is another argument in favour of *x*-ray pelvimetry. This can now be carried out with any standard radiographic plant and is sufficiently accurate for clinical purposes, as the possible error in a properly carried out *x*-ray pelvimetry does not exceed 4 to 5 mm. I have been using Thoms's method for a number of years,

and have had the opportunity of comparing the results of the *x*-ray pelvimetry by this method with direct pelvic measurements carried out in patients who have subsequently undergone a laparotomy. The error found was very small, and could be accounted for by the thickness of the soft parts.

X-ray pelvimetry can be carried out even in advanced pregnancy. It brings an element of reassurance to both patient and practitioner in normal cases, and gives a true picture of the brim in contracted pelvis.—I am, etc.,

London, W.1, Feb. 5. A. ORLEY.

Contraceptives and Fertility

SIR,—In your issue of January 22 Mr. Green-Armytage is reported as saying at a meeting of the West London Medico-Chirurgical Society on January 7 that he "was convinced that contraceptive measures in the early days of marriage were inimical to pregnancy at a later date." I have been instructed by the Medical Subcommittee of the National Birth Control Association to draw the attention of your readers to the fact that there appears to be no medical evidence whatever to corroborate this statement. Records which have been carefully kept at clinics go to show that in many thousands of instances fertility has been in no way impaired by the use of contraceptive measures in early married life. The Medical Subcommittee will be glad to provide further information on this important subject if any of your readers are interested.—I am, etc.,

M. A. PYKE,
Secretary, The National Birth Control Association.

26, Eccleston Street, S.W.1, Feb. 1.

Temporary Sterilization by X Rays

SIR,—In your report of the meeting of the Sections of Radiology and of Obstetrics of the Royal Society of Medicine in the *Journal* of January 29 (p. 248) Dr. J. F. Bromley is quoted as having said: "Temporary sterilization in a young patient could be obtained without difficulty by *x* rays, and did not in any way preclude a later possibility of normal conception and the birth of healthy children." If this is so, have we not here a better means of contraceptive practice than either Graafenburg rings which fall out or occlusive pessaries which ladies forget to put in?—I am, etc.,

Droitwich, Jan. 31. E. SHIRLEY JONES.

Coughing in Public

SIR,—Is it not time that the public was educated in the matter of the spread by droplet infection of the common cold and other diseases of the upper respiratory tract? Our public vehicles bear formidable notices, "No Spitting, Penalty £5"; surely space could be spared in them for the display of a few posters, preferably illustrated, on the lines of "Do Not Cough on your Neighbour, It is Dangerous" or "Protect your Neighbour from your Germs by Covering your Mouth when you Cough." A great amount of time is lost in industry owing to the common cold. It is useless to upbraid the medical profession for being unable to prevent this so long as colds are widely disseminated by a generous public coughing their infective organisms into the faces of their neighbours.

Unfortunately the medical profession itself has much to learn in this respect. At a medical meeting I attended recently about three-quarters of the audience coughed consistently throughout the proceedings and only a small minority placed their hands before their mouths. As the temperature of the room was—as is usual at medical meetings—somewhere about 75° F. and ventilation was *nil*, the atmosphere formed a perfect incubator for the pathogenic organisms so freely distributed by the coughers.

Doubtless this matter is one for the public health authorities, but reference to it in the medical press may at least call attention to what is a serious, yet preventable, source of infection.—I am, etc.,

London, W.1, Feb. 3. RUBY O. STERN.

Correct Footwear

SIR,—Public attention has at last been drawn to the absurdity of women's footwear, particularly to pointed shoes and the lack of a straight line from the extremity of the big toe to the inner side of the heel, resulting in the big toe becoming pressed outward and producing a prominence at the metatarso-phalangeal joint, followed by inflamed bursa (bunion) and probably corns. Corns also are prone to occur on the dorsal surface of the little toe for the same reason. The want of a straight inside to a shoe is not the only cause of deformity. The high heel also contributes its quota. The main idea of the high heel is that it heightens the arch of the foot and gives an appearance of shortening. This appears to be the main reason why it is so fashionable. But, while apparently shortening the foot, it broadens the ankle. A most important point is that the platform on which the wearer's heel rests is not on the level but on an inclined plane. In consequence the foot is always slipping downwards and forwards, so that the weight of the body rests not on the os calcis but on the heads of the metatarsals, jamming the foot into the narrowest part of the shoe and flattening out the metatarsal arch. Callosities form on the soles of the feet and still further incapacitate the wearer.

After these high-heeled shoes have been worn for a time the small leather on the sole of the heel, which is about an inch square and often less, begins to wear down either at one side or on three sides, and the heel becomes uneven and sometimes conical. This is partly due to oscillation, for each time the wearer puts her foot down a certain amount of oscillation takes place as she corrects her balance, and as the heel gets still more worn the difficulty of correcting balance is increased. This want of balance is quite different from that experienced when learning to skate, as the heel is on the same level as the toes. With a high-heeled shoe the wearer's centre of gravity is thrown forward, and to compensate for this the knees must be bent, and to keep the body erect there is great strain on the anterior longitudinal and the iliolumbar ligaments, with resulting low backache pain, etc. The wearer becomes unable to walk far because of pain in her feet and in her back, does not get exercise, and suffers from indigestion and constipation as the result of a faulty pose. As she gets older there is the tendency to put on weight, with further strain on the knee-joints and feet, resulting in a villous arthritis of the knee-joints.

It is an everyday occurrence to see young women going about hobbling, with expressions indicating that they are in pain and trying to make the best of it. As they get older these women come to the spas with flat feet, chronic villous arthritis, and obesity. Can nothing be done to stop it? The manufacturers make a great song about looking after children's feet, and usually no fault can be found with the footwear provided for school children, but when a girl leaves school there is nothing for her but anatomical monstrosities; she has to go straight from

the school shoe, with its broad flat heel, to the high heel and pointed toe. True, she may be able to get a brogue shoe with flat heel for outdoor country wear, but indoor shoes, slippers, afternoon and dancing shoes are all of the so-called fashionable, pointed, high-heeled variety. Of course shoes can be made individually for the wearer, but they are expensive, especially when she requires to have a number suitable for wearing with different frocks. The typist, shop girl, secretary, etc., cannot afford this, and therefore has to take what the manufacturer offers. I have had the opportunity of speaking to several manufacturers and they maintain these extravagant shapes are what the public demand. Yet I am continually getting complaints from mothers and daughters of the impossibility of getting correct shoe wear. The retail shoe provider makes a great show with his *x*-ray apparatus, and he has shoes with innumerable varieties of patent arch- and toe-supports, which may or may not assist in correcting the deformities which they in the main have previously produced. *X*-ray films taken with the patient wearing high-heeled shoes show that only half the upper articular surface of the talus is engaged, the anterior portion of the articulation having nothing to work on.

Is it not time for the medical profession to urge from a national health point of view that the shoe manufacturers provide a shoe on real anatomical lines?—I am, etc.,

Harrogate, Feb. 2. G. L. KERR PRINGLE.

Technique of Blood Transfusion

SIR,—From personal experience of receiving blood transfusions I should like to mention one or two relevant points which I think could with advantage be emphasized.

First, and of paramount importance, is the rate of transfusion. Dr. H. F. Brewer in his excellent article (*Journal*, January 29, p. 241) suggests that a pint in half an hour is a reasonable rate. May I make a plea that this be regarded as the maximum rate, and that on occasions this time should deliberately be exceeded? Blood transfusion is a procedure that may so easily and unconsciously be hurried. Patience on the part of the operator will add greatly to the comfort of the patient, and may often avoid some of the unpleasant catastrophes that occasionally occur. Transfusion by the clock—not against it—will be helpful in developing this necessary virtue. At the same time the temperature of the blood should be kept as near to the ideal as possible, a point to be watched when the transfusion is given slowly.

Secondly, in transfusing patients with severe infections the quantity of blood should be rather on the low side. This type of patient usually develops a severe delayed reaction, probably of a non-specific protein character. This reaction very often has a beneficial effect on the course of the infection, and one which I believe is of more importance than the actual increase in haemoglobin to the patient, but it may easily become too violent. Little and often is, I think, good practice to follow in these cases.

Finally, with regard to the amount of citrate added. That suggested by Dr. Brewer—0.3 gramme for every 100 c.cm. of blood—may comfortably and safely be used, but I think it is easy to be too lavish with the citrate in order "to be on the safe side." I believe that a good many of the unpleasant sensory symptoms experienced in the course of transfusions are due to the temporary alkalosis induced by the citrate. Where excessive quantities are used the symptoms of tetany that may occur, though of short duration, may be quite alarming. As the action of the citrate appears to be rapidly dealt with and adjusted in the body, emphasis on the slowness of transfusion will also help to reduce the occurrence of these symptoms.—I am, etc.,

Feb. 1. RECIPIENT.

The Radiologist's Range of Service

SIR,—In the *Journal* of February 5 (p. 310) Mr. H. Osmond Clarke criticizes Dr. C. H. C. Dalton's letter (January 22, p. 206). May I, as a radiologist of forty-two years' experience, criticize Mr. Clarke's view of the duties and restricted range of service of the radiologist? A radiologist is not a mere technician, but is now recognized as a "medical physician who specializes in radiology." In almost all reputable hospitals the radiologist constantly confers and consults with any or all of his surgical, medical, and other colleagues, and they decide together what is best to be done for the patient according to their combined findings. It has also been my custom to confer or consult with other medical men who have in private sent cases to me, with the happiest results to all concerned. Medical knowledge and treatment must be considered as a whole: it cannot be bound down and pigeonholed into specialized compartments without injury to our patients.—I am, etc.,

South-Eastern Hospital for Children, Sydenham, Feb. 6. GEORGE B. BATTEN.

The Problem of the Final M.B., B.S.Lond.

SIR,—May I crave a little more of your space to add a few words to my previous letter?

I have read again the letters that have been published on this subject, and the reading of them has left my mind in a whirl. The writers, for the most part, are practised controversialists and politicians—not statesmen—and there is some truth in the gibe of Dr. Gray that "Sir Ernest and his friends appear to take no interest in the student or in his educational career." My sympathies are entirely with the student (and with his parents). I submit that the students are to a very large extent the University, it cannot exist without them; and that therefore the policy of the University should confine itself to them and take no account of the Royal Colleges.

But my chief reason for writing is to draw attention to an amazing statement made by Sir Ernest Graham-Little in his last letter. He writes that at a full meeting of the subcommittee of the Faculty Board the suggestion that the examination should be held four times a year was turned down because "this action would constitute 'competition' with the Colleges." Could there be stronger evidence of the medical side of the University being, so to speak, in the pocket of the Colleges, or stronger evidence of the strength of their following on the Faculty Board? Surely London University is important enough and strong enough to act alone.—I am, etc.,

Mayfield, Sussex, Feb. 7. STANLEY COLYER.

J. C. Mauury (*Thèses Nancy*, 1936-7, No. 12), who records seventeen cases, in patients aged from 3 to 18, maintains that there is a special form of purpura which occurs in connexion with scarlet fever; he calls it post-scarlatinal purpura fulminans. The condition appears to be most prevalent in the Anglo-Saxon race, ten of the seventeen cases being English and four American. Sudden aggravation of the symptoms and the accompanying pain are characteristic. Fifteen of the seventeen patients died. The author considers the condition an example of the haemorrhagic allergy described by Sanarelli and Shwartzman.

Obituary

Mr. CHARLES ARTHUR PARKER, who died at High Wycombe on January 26, was the son of a Lincolnshire clergyman and younger brother of the late Lord Parker of Waddington, Lord of Appeal in Ordinary. From Bradfield College he went to St. Bartholomew's Hospital in 1882—at the age of 19—and after qualifying as M.R.C.S. and L.S.A. in 1886 became house-surgeon to Sir William Savory. He was then in turn resident medical officer, senior clinical assistant, and surgeon at the Throat Hospital, Golden Square, being elected to the consulting staff on his retirement from professional work in 1925. He had obtained the F.R.C.S.Ed. diploma in 1894, and for some years combined general practice at Rickmansworth with his laryngological practice in London. Parker wrote a small book on post-nasal growths in 1894, and in 1906 published his *Guide to Diseases of the Nose and Throat and their Treatment*, of which a second edition, with Mr. Lionel Colledge as joint author, appeared in 1921. His standing in the specialty was recognized by election to the presidential chair of the Laryngological Section of the Royal Society of Medicine. For the past twelve years he had lived wholly at High Wycombe, and entered into the public life of the district. He served on the borough council and was active in the local branch of the St. John Ambulance. Though he took no part in the ordinary medico-political work of the British Medical Association during thirty years of membership, Parker was profoundly interested in some of the larger aspects of medical and public health policy. With Professor Benjamin Moore he was an early advocate of a State medical service to replace the wasteful competition and the lack of co-ordination, and bridge the gaps, which they deplored in medical practice.

The death occurred on January 2 of Dr. ROBERT WATSON at his residence, 184, Belmont Road, Belfast. He was educated at Queen's University, Belfast, and graduated M.B., B.Ch., B.A.O. in 1895. He proceeded M.D. in 1899. He was one of the best-known practitioners in East Belfast, where he had practised for thirty-five years. His outlook on life was sincere: he had definite principles which made him a pleasing colleague and a great friend of his patients. The regard in which he was held by his patients and friends was a tribute to his personality. During all the years of his practice in the Bloomfield area he made numerous lifelong friends, and it was with regret that his many patients learned that he intended to retire at the end of 1936. Unfortunately the years of leisure he had planned with his wife and family were not fulfilled, and a sudden end has occurred to a happy life of usefulness. In addition to his professional practice Dr. Watson had art as a hobby, some of his paintings being hung in the Belfast Municipal Art Gallery. He was a firm advocate of the temperance cause, but while maintaining his principles he never lost a friendship. His wife is a doctor, as also are two of his daughters. He had been a member of the British Medical Association for nearly thirty years.

Mr. GRAVES STOKER, F.R.C.S.I., who died on January 28 at the age of 73, at his residence, Gaddesden Hall, near Hemel Hempstead, received his medical education in London, Trinity College, Dublin, and Vienna. In 1889 he became a Fellow of the Royal College of Surgeons of Ireland, where he was at one time senior demonstrator in anatomy. Continuing his father's practice in Rutland Square, Dublin, he was later elected consulting surgeon to Cork Street and Drumcondra Hospitals, and for some years was also a member of the Council of the Royal College of Surgeons of Ireland. On the death of his brother Ernest Mr. Graves took over his practice in London, and resided there until 1932. During the war he was attached to the Rochester Row Military Hospital, and was later appointed assistant surgeon to St. Paul's Hospital, Endell Street. He had been a member of the British Medical Association for thirty-two years in all, and in 1915 contributed to the *British Medical Journal* a record of 1,000 operations for the radical cure of hernia; he had also published pamphlets on the treatment of venereal diseases. In his youth a keen Rugby player, he had been a member of the Dublin Wanderers team. In 1903 he married Constance Bennet, M.B., Ch.B., who survives him with two sons and three daughters.

At the time of his death on January 28, at the age of 84, Dr. GEORGE HANNA RUSSELL was the senior magistrate of Manchester, having been appointed to the Bench in 1892. He received his medical education at Guy's Hospital, where he won the Treasurer's Gold Medal; in 1879 he graduated M.B.Lond. and became a Member of the Royal College of Surgeons. He proceeded M.D. in 1882. Three years later, after spending a short time in the Australian bush as a medical attendant and travelling companion, he removed to Manchester. Here he built up a large general practice, interesting himself also in the public life of Gorton and Longsight, being one of the Liberal leaders who supported against strong opposition the amalgamation of these two districts with the city. After the amalgamation he headed the poll in the first election to the City Council, and was the first alderman to represent the Longsight ward. When he retired from active municipal life he continued his interest in Parliamentary elections, often taking the chair for Liberal candidates at their meetings.

Dr. JOHN RUSK died at his residence, Antrim Road, Belfast, on January 26 in his seventy-fifth year. He was educated at Queen's College, Belfast, and graduated M.B., B.Ch., B.A.O. in 1894. He was well known for many years, and not only in his profession. For some time past he had been in indifferent health, but his friends did not know that the end was so near. As a student at Belfast he was popular and outstanding; later he pursued postgraduate study in Galway and Vienna, and the experience he gained, in conjunction with his natural ability and pleasing personality, soon assured him of an extensive practice. Literature and bowls were his hobbies, and, in addition, he was interested in the temperance cause. To the bowling fraternity Dr. Rusk was almost an institution. He first became interested almost forty years ago, and his skill was so much appreciated that he was a member of the Irish team in international contests, and toured in Australia and New Zealand as a representative in the Empire games. His friends in the medical profession will miss one of the most loyal of colleagues and one of the most respected of the senior generation, which is so fast disappearing in Belfast. Much sympathy will be extended to his widow and brother. He had been a member of the British Medical Association for forty years. He was a Fellow (late vice-president and honorary treasurer) of the Ulster Medical Society.

Dr. EDWARD WALTON SPENCER ROWLAND, who died on January 22 at his home in Reading at the age of 64, was the second son of the Rev. Charles Brown Rowland, formerly vicar of Wolverley, Worcestershire. He began his medical studies at the University of Cambridge, and after taking his B.A. went to Guy's Hospital and qualified as M.R.C.S., L.R.C.P. in 1899. He then served as house-physician, senior obstetric resident, and clinical assistant at Guy's. While in general practice he was appointed surgeon to the Reading Dispensary, afterwards medical officer to the borough infectious diseases hospital and medical officer to St. Andrew's Boys' Home, an institution in which he took much interest. Dr. Rowland was for some years consultant for cerebrospinal fever to the Berkshire County Council. He joined the British Medical Association in 1902 and was elected chairman of the Reading Division in 1918; he was also a member of the Reading Pathological Society. He retired from active work a few years ago.

The death occurred suddenly in Perth on February 1 of Dr. CHARLES PARKER STEWART, who had been medical officer of health for Perth City for many years. Dr. Parker Stewart was born in 1870, and after a medical course at Edinburgh University graduated M.B., C.M.Ed. in 1893, taking the degree of B.Sc. in Public Health in the following year and that of M.D. in 1915. After a period of practice at Perth, during which he was assistant surgeon to Perth Royal Infirmary, he became medical officer of health for the city. He was superintendent of the Hospital for Infectious Diseases in Perth, and surgeon to Perth City Police. He had published various articles dealing with public health, including one on the supervision of small-pox contacts and several on the subject of infantile mortality. He had retired from the post of medical officer of health only the day before his death. Dr. Stewart was an active member of the British Medical Association, which he joined in 1898. He was treasurer of the Perth Branch in 1920–1, and in March, 1922, became secretary and treasurer of the Branch, a post he held until his death. He also acted as representative of the Branch at the Annual Representative Meetings in 1920, 1921, 1926, 1930, and 1935. "R. B." writes: Parker Stewart was unassuming, and while he had definite ideas of his own was always ready to listen to the opinions of others, hence the work of his department always went smoothly, and he carried his professional brethren with him. The great care of his life were children. He was never happier than at his child welfare centre, where besides dealing with them professionally he would sing to them, make drawings for them, and do conjuring tricks at which he was an expert. He was for over forty years a member of the B.M.A., and was for many years secretary to the local medical and panel committee. In this position also he carried out his duties with rare fidelity and tact, especially relative to the prescription subcommittee, where he would wade through thousands of prescriptions and tabulate them—a difficult job, in which his early pharmaceutical training stood him in good stead. He retired under the superannuation scheme on January 31 and died on his first day of retirement, to which, with his physical and mental powers unimpaired, he had not looked forward. The medical profession in Perth have lost a good and loyal friend, without cant or humbug, and one who was always ready to help in any good cause. He had no enemies. He is survived by a family of three sons, one of whom is in practice as a dentist in London. At the funeral service tribute was paid to his work : it was attended by civic and public bodies and every available medical practitioner in the area.

Dr. GERALD JOSEPH WALTON TIERNEY, who died recently in a Dublin nursing home at the age of 52, graduated M.B., B.Ch., B.A.O. of the Royal University of Ireland in 1908, and in 1912 became a Fellow of the Royal College of Surgeons in Ireland. Dr. Tierney had been for some years assistant gynaecologist to St. Vincent's Hospital, Dublin, external examiner in midwifery and gynaecology for the National University of Ireland, and examiner for the Central Midwives Board for Ireland. Before settling down in private practice he had worked at the Universitäts Frauenklinik in Berlin, and held the post of assistant master of the National Maternity Hospital, Dublin. Last year he travelled with the Irish National Pilgrimage to Lourdes as one of the chief medical advisers.

Dr. JOHN MATHESON, who died at Plockton, Ross-shire, on January 17, aged 81, had been a member of the British Medical Association for half a century, and practised for many years in Gibson Square, London, N. He had a distinguished student career at the University of Aberdeen, graduating M.A. in 1879, M.B., C.M. in 1883, and M.D. in 1886. During forty-five years of unbroken professional service in North London Dr. Matheson held many appointments, including that of honorary surgeon to the Royal Caledonian Schools at Bushey. He was president of the Caledonian Medical Society in 1922, when it held its annual meeting in London. He had been a director of the Highland Society and a member of its bursary committee, president of the Gaelic Society, and was an original member of the Gaelic Service Committee. On his retirement from active work in 1930 Dr. Matheson returned to Scotland and made his home at Plockton in Lochalsh, in the old family house which he had never given up. He was a Justice of the Peace for the counties of London and Cromarty.

We regret to announce the death on January 28 at his home in Kennington Park Road of Dr. HENRY HARVEY NORTON, aged 73. Dr. Norton was a student of St. Mary's Hospital, and took the M.R.C.S. diploma in 1887 and the L.R.C.P. in 1888. Before settling down in general practice he served as house-surgeon and house-physician of St. Mary's Hospital, and later as house-surgeon at the Horton Infirmary, and contributed a note to the *British Medical Journal* on "Tracheotomy under Difficulties." He joined the British Medical Association in 1896 and was chairman of the Lambeth Division on two occasions—in 1924–5 and again in 1928–9. Among the appointments he held was that of surgeon to the Linen and Woollen Drapers' Institution.

The Services

PARKES MEMORIAL PRIZE, 1937

Major J. Biggam, *M.C.*, R.A.M.C., has been awarded the Parkes Memorial Prize for 1937 for his very valuable investigations into the lighting of barracks and other military institutions coupled with important work he has carried out in regard to the effect on vision of the wearing of the service respirator and the designing of a suitable spectacle frame for wearing with the respirator by men with impaired vision. The prize is awarded annually to the officer who is considered by the committee to have done most to promote the advancement of naval or military hygiene by professional work of outstanding merit, and is open to medical officers of the Royal Navy, the Army, and the Indian Army, with the exception of the professors and assistant professors of the Royal Naval Medical College, Greenwich, and of the Royal Army Medical College, London, during their term of office.

NAVAL COMPASSIONATE FUND

At the quarterly meeting of the directors of the Naval Medical Compassionate Fund, held on January 21, Surgeon Vice-Admiral P. T. Nicholls, C.B., K.H.P., Medical Director-General of the Navy, in the chair, the sum of £96 10s. was distributed among the several applicants.

DEATHS IN THE SERVICES

Major ALEXANDER KEITH ROBB, R.A.M.C., died at Maymyo, Upper Burma, on December 3, 1937, aged 45. He was born on May 5, 1892, and was educated at Aberdeen, where he graduated M.B., Ch.B. in 1916. He entered the Royal Army Medical Corps as lieutenant in the Special Reserve on November 10, 1916, took a permanent commission as captain from March 4, 1920, and became major on September 4, 1928. Before he went to India he held the appointment of radiologist at the Royal Victoria Hospital, Netley. He served in the war of 1914–18.

Lieutenant-Colonel ROBERT HENRY BOTT, C.I.E., I.M.S. (ret.), died in a nursing home in London on January 21, aged 55. He was born on August 22, 1882, was educated at St. Bartholomew's Hospital, and took the M.R.C.S., L.R.C.P. in 1905, and subsequently the F.R.C.S. in 1907 and the M.B., B.S.Lond. in 1909. After filling the post of senior house-surgeon at St. Bartholomew's Hospital he entered the Indian Medical Service as lieutenant on September 1, 1906, became lieutenant-colonel on March 1, 1926, and retired on November 10, 1932. He served on the North-West Frontier of India in the Zakka Khel campaign of 1908, receiving the frontier medal with a clasp. On June 1, 1917, he received the Kaisar-i-Hind Medal, First Class, and the C.I.E. on January 1, 1926. He had been a member of the British Medical Association since 1910.

Lieutenant-Colonel MAURICE SWABEY, R.A.M.C. (ret.), died at Bath on January 27, aged 69. He was born at Prince Edward Island, British North America, on July 4, 1868, the son of the late Rev. Henry Birchfield Swabey, was educated at St. Bartholomew's Hospital, and took the M.R.C.S., L.R.C.P. in 1892. After filling the post of junior house-surgeon at the Wolverhampton and South Staffordshire County Hospital, he entered the Army as surgeon lieutenant on July 29, 1896, became lieutenant-colonel in the long war promotion list of March 1, 1915, and retired on September 27, 1922. He served in the war of 1914–18.

Lieutenant-Colonel JAMES SCOTT, Madras Medical Service (ret.), died at Dumfries on January 19, aged 78. He was born on July 20, 1859, the son of James Scott, manufacturer, of Troqueer, Kirkcudbright, and was educated at Edinburgh University, where he qualified M.B., C.M. in 1880. He entered the Indian Medical Service as surgeon on April 1, 1882, became lieutenant-colonel after twenty years' service, and retired on October 23, 1907. He served in the campaign on the North-West Frontier of India in 1897–8, in the Tochi Valley, receiving the frontier medal with a clasp. His whole service was passed in military employment.

Colonel CHARLES HENRY BEATSON, C.B., Bengal Medical Service (ret.), died at Colchester on January 20, aged 86. He was born at Table Bay, Cape of Good Hope, on March 27, 1851, the son of Surgeon General G. S. Beatson, C.B., Army Medical Department, was educated at Edinburgh and Glasgow Universities, and took the L.R.C.P. and S.Ed. in 1873. He entered the Indian Medical Service as surgeon on September 30, 1876, and was on temporary half-pay from May 8 to December 21, 1882. He attained the rank of colonel on June 16, 1905, and retired on March 27, 1911. He spent his service in military employment. He served in the second Afghan War in 1879–80, receiving the medal, and on the North-East Frontier of India in the Manipur campaign of 1891, when he was mentioned in dispatches and received the frontier medal. He rejoined for service in the war of 1914–18, and served from October, 1914, to 1916, being employed in connexion with the Indian hospitals in England. He received the C.B. on June 23, 1907.

Universities and Colleges

UNIVERSITY OF OXFORD

The Master and Fellows of University College have established a Radcliffe Medical Fellowship out of surplus income of the Linton Fund, to be tenable as an official Fellowship. If a suitable candidate presents himself the Master and Fellows will elect him in Trinity Term, 1938, to this Fellowship, combined with a Praelectorship in Medical Science. The Fellow will be responsible for teaching in physiology and biochemistry for the Final Honour School and for supervision of members of the College reading biology and medicine. He may also be required to take a share in the general work of the College, and must reside within the College during full term. He will enter on his duties on October 1, 1938. The initial emoluments of the Fellowship and Praelectorship will be not less than £450 per annum, with rooms in college free of rent, rates, and taxes, and participation free of charge in the common college dinner. The Fellowship is open to all candidates who have passed the examination for B.M. in the University of Oxford, or an equivalent degree elsewhere. Further particulars may be had from the Master, to whom applications, with not more than three testimonials and three personal references, should be sent by April 30.

UNIVERSITY OF CAMBRIDGE

The Raymond Horton Smith Prize for 1936–7 has been awarded to H. L. H. Green, M.D., of Sidney Sussex College. The prize is awarded to the candidate who presents the best thesis for the M.D. degree during the academical year.

At a congregation held on February 4 the following medical degrees were conferred:

M.D.—R. M. Dowdeswell.
M.B., B.CHIR.—J. S. Joly, R. D. I. Beggs.
M.B.—*K. L. Buxton.

* By proxy.

UNIVERSITY OF LONDON

UNIVERSITY COLLEGE

A course of three public lectures on "Surface Chemistry and Biology" will be given by Dr. J. F. Danielli in the department of physiology, pharmacology, and biochemistry of the College on Mondays, at 5 p.m., beginning February 28. The lectures are open without fee or ticket to students of the University and others interested in the subject.

UNIVERSITY OF DURHAM

On February 2 the Council of King's College, Newcastle-on-Tyne, approved the appointments of Dr. Albert Gild and Dr. J. W. M. Sutherland as demonstrators in anatomy.

UNIVERSITY OF LIVERPOOL

The Council of the University on February 1 conferred the title of Professor Emeritus on Walter Scott Patton, M.B., Ch.B.Ed., Dutton Memorial Professor of Entomology, 1927–37.

ROYAL COLLEGE OF PHYSICIANS OF LONDON

The Croonian Lectures, on "The Clinical Aspects of the Transmission of the Effects of Nervous Impulses by Acetylcholine," will be delivered at the College, Pall Mall East, S.W., by Professor F. R. Fraser on May 24, 26, and 31, at 5 p.m.

BRITISH COLLEGE OF OBSTETRICIANS AND GYNAECOLOGISTS

A quarterly meeting of the Council was held in the College House, 58, Queen Anne Street, London, on January 29, with the President, Sir Ewen Maclean, in the chair. Professor Grace Stapleton, New Delhi, India, was admitted to the Fellowship of the College.

Membership

Dr. Allan Frederick Hollinrake, Hamilton, Canada, was admitted a Member of the College and the following were elected to Membership:

Yeshwant Narayen Ajinkya (India), John James Armitage (Salisbury), Elinor Francis Elizabeth Black (Canada), Doris Barbara Brown (Harrogate), William Deans Brown (London), William Davies Cunningham (Australia), Mary Evans (Manchester), Martin Birks Hallam (Manchester), Ockert Stephanus Heyns (Manchester), Fergus Duncan Johnston (Canada), John Cameron Loxton (Australia), Benjamin Edward Meek (Canada), John Miller (Greenock), Edward Brettingham Moore (Tasmania), Susanne Jean Paterson (Edinburgh), Robert William Nichol (London), Charles Guy Roworth (Aberdeen), Linton Morris Snaith (Manchester), David Fox Standing (South Africa), Dorothy Marian Stewart (London), Robert Atkinson Tennent (Glasgow), Geoffrey Ashburton Thompson (Australia), William Howie Tod (Leeds), Clifford Vincent Ward (Canada), John Clinton Whyte (Canada), Alice Woodhead (Canada).

The President has been appointed representative of the College on the Royal Commission on the Geographical Distribution of the Industrial Population, and Mr. J. Bright Banister representative on the Council of the Queen's Institute of District Nursing.

The name of Mr. Harold Burt-White has been restored to the roll of Members of the College.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH

At a quarterly meeting of the College, held on February 1, with the president, Dr. Alexander Goodall, in the chair, Dr. J. D. W. Pearce (London), Dr. J. P. McGibbon (Edinburgh), and Dr. W. M. Arnott (Edinburgh) were introduced and took their seats as Fellows of the College.

CONJOINT BOARD IN SCOTLAND

The following candidates, having passed the requisite examinations, have been admitted L.R.C.P.Ed., L.R.C.S.Ed., L.R.F.P. and S.Glas.:

M. J. Ackerhalt, Zola S. Alpert, A. Appel, S. Bauman, R. A. Blair, E. Cohn, R. M. Cross, T. B. Dev, R. B. Dobson, E. F. Duschock, M. M. Elkind, M. Friedman, J. Gillman, K. A. Graf, H. Grundmann, V. Guyer, A. T. R. Hamilton, T. W. Howat, H. Hutton, W. M. Jamieson, K. E. Karunaratne, Yetta Kuper, M. Levin, H. Leibowitz, M. Lichtensteinas, J. T. McCutcheon, P. W. Fitz-J. McIlvenna, J. McMillan, K. P. F. J. M. Mangold, W. Meadow, J. E. Mishlef, W. S. Murray, R. P. Myers, Anna Noll, U. E. Oberworth, S. Pollack, J. S. Pomerantz, L. Rae, A. Rapoport, F. L. Reardon, C. G. Rosenstock, W. Rothman, N. Schwartz, L. Scovronek, M. Shapiro, M. R. Simon, W. E. C. Taylor, A. J. Walder, M. Weinschel, D. Wilson, A. A. Wright.

Medical Notes in Parliament

The House of Commons this week completed the committee stage of the Coal Bill.

The Middlesex Hospital Bill, the St. Bartholomew's Hospital Bill, and the Salford Royal Infirmary and Hospital Bill were read a first time in the House of Lords on February 1.

Sir Kingsley Wood presented the Housing (Financial Provisions) Bill on February 2, and it was read a first time. The Bill alters the basis of subsidy for the rehousing of persons from overcrowded dwellings and also proposes a new subsidy for rural housing.

The Prevention and Treatment of Blindness (Scotland) Bill was reported to the House of Commons on February 8 without amendment from the Standing Committee on Scottish Bills.

Sir Francis Fremantle, Dr. Salter, and Dr. Howitt have invited all Members of both Houses to a meeting at the House of Commons on February 17, when Lord Horder and Sir Frank Fox will speak on the work of the British Empire Rheumatism Council.

The Parliamentary Medical Committee, meeting at the House of Commons on February 8, discussed milk as a food and the attitude of the Press towards the advertisements proposed by the British Medical Association. In the discussion some sympathy was expressed for those critics who fear that too great attention to the dangers of milk will frighten people from consuming it. The meeting heard an account of the milk policy pursued in Northern Ireland and of its results. The committee also favourably discussed the Night Baking Bill. Notice was taken of the lack of medical books in the House of Commons library, and the possibility of remedying this was discussed.

Foot-and-Mouth Disease

On February 1 Mr. W. S. MORRISON, replying to Mr. A. Short, said that since his last statement in the House on the foot-and-mouth disease position on November 11 additional farms had been declared infected, but in the majority of these infection was due to contiguity to existing outbreaks. There had, on the whole, been an improvement. Excluding an isolated outbreak in Essex confirmed on January 22, and one in Kent on January 14, there had been no outbreaks for three weeks in any of the eastern or south-eastern counties to which it was necessary to apply a "standstill" order. Of a total of thirty-six outbreaks confirmed during the past fourteen days, thirty-three were in the adjoining counties of Wilts, Dorset, Somerset, Berkshire, and Hampshire, the remaining three outbreaks being in Essex and the West Riding.

The Blind Persons Bill

During the committee stage of the Blind Persons Bill in the House of Commons on February 1 Mr. JAGGER moved an amendment to ensure that if any dispute arose whether or not a person was blind within the meaning of the Bill the local authority where the person lived should make arrangements for that person to be examined by two ophthalmic surgeons, whose decision, unless there was disagreement, should be final. Where there was disagreement the local authority should arrange for the person to be examined by a third ophthalmic surgeon, whose decision should be final.

Sir KINGSLEY WOOD said he could not accept the amendment. The schedule to a circular issued by his Department in 1933 set out the optical criteria necessary, and recommended that the examination should be carried out by a medical practitioner with special experience in this kind of work. The effect had been to reduce very substantially the number of cases in which any reasonable doubt could arise about a person's blindness. In a number of cases local authorities also had available a reference service—as, for instance, that provided by the Northern Counties Association. It would not be practicable everywhere to establish such a service or make the arrangements proposed by the amendment, because in some areas it would be difficult and in others impossible to find the requisite number of medical practitioners with the special experience necessary.

The amendment was withdrawn and the Bill passed through committee.

Pasteurized Milk and Tuberculous Infection

Mr. W. S. MORRISON told Captain Arthur Evans on February 7 that his attention had been drawn to investigations carried out by the Hannah Institute of Dairy Research into the feeding of calves on raw and pasteurized milk by experiments with two groups of calves, the first group with ordinary commercial milk in its raw state, the second group with the same milk after it had been submitted to ordinary commercial pasteurization in a local dairy. The results showed that of the thirty-six calves fed on ordinary commercial milk in its raw state twenty-three were ultimately found to be infected by tuberculosis mainly in the lungs, and of the thirty-seven calves fed on the same milk after it had been submitted to ordinary commercial pasteurization in a local dairy no case of tuberculous infection was found. The Government intended to bring forward legislation this session on the lines of the proposals regarding the compulsory pasteurization of milk, which were outlined in the White Paper on milk policy issued last July.

Typhoid in Somerset.—Twenty-four cases of typhoid (three fatal) in the county of Somerset had been confirmed when Sir KINGSLEY WOOD, on February 3, answered a question about the outbreak. The source of infection had not then been established, and a medical officer of the Ministry of Health was assisting in the investigations.

Research in Epilepsy.—In a reply to Sir Arnold Wilson on February 3 Sir KINGSLEY WOOD stated that the Medical Research Council was carrying out investigations bearing upon epilepsy and related conditions. The British Government was not officially represented on the Council of the International League against Epilepsy, nor did it make a contribution in aid of the Council's work.

School Children and Free Milk.—Mr. KENNETH LINDSAY, in a reply on February 3, said the Board of Education recognized it was desirable that children selected for free milk at school should continue to receive it when absent through illness. It would be difficult to devise suitable arrangements, but the matter was receiving consideration. When children were recommended for free meals or milk it was not necessary that they should first be certified by the school medical officer as suffering from subnormal nutrition. It was important, however, in the interests of the children that those selected should be seen by him as soon as possible.

Health of Durham School Children.—Mr. KENNETH LINDSAY, for the Board of Education, furnished the following table on February 8:

School Children Examined at Routine Medical Inspections in Durham County Council's Area

Year	Number Inspected	Classification of the Nutrition of Children Inspected							
		Excellent		Normal		Slightly Subnormal		Bad	
		No.	%	No.	%	No.	%	No.	%
1935	40,476	5,151	12.7	26,193	64.7	8,025	19.8	1,107	2.7
1936	40,500	5,269	13.0	26,899	66.4	7,691	19.0	641	1.6
1937	39,874	5,282	13.2	25,673	64.4	8,522	21.4	397	1.0

No. 4

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended January 29, 1938.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for : (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland. Median values for the last 9 years for (a) and (b).

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for : (a) The 125 great towns (i) in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns (ii) in Eire. (e) The 10 principal towns (iii) in Northern Ireland.

A dash — denotes no cases ; a blank space denotes disease not notifiable or no return available.

Disease	1938					1937 (Corresponding Week)					1923-36 (Median Value Corresponding Weeks)	
	(a)	(b)	(c)	(d)	(e)	(a)	(b)	(c)	(d)	(e)	(a)	(b)
Cerebrospinal fever	28	5	16	7	—	32	6	11	—	2		
Deaths		3	4				3	1				
Diphtheria	1,892	200	245	64	61	1,241	129	217	61	47	1,400	201
Deaths	40	7	8	5	3	32	5	7	—	1		
Dysentery	273	65	97		—	41	7	11		—		
Deaths				—	—				—	—		
Encephalitis lethargica, acute	3	1	—		—	6	—	—		—		
Deaths		3					2					
Enteric (typhoid and paratyphoid) fever	61	8	3	—	—	53	3	3	5	—	26	—
Deaths	2	—	2	—	—	2	—	—	—	—		
Erysipelas			95	9	6			79	2	3		
Deaths		1					3					
Infective enteritis or diarrhoea under 2 years												
Deaths	60	25	7	9	2	38	12	8	5	2		
Measles			1,661		751*			47		—		
Deaths	37	2	17	3	22	8	—	1	1	—		
Ophthalmia neonatorum	103	12	47		—	79	8	35		1		
Deaths												
Pneumonia, influenzal ‡	1,302	110	11	8	26	3,555	211	431	113	30	1,559	180
Deaths (from Influenza)	60	9	8	2	—	1,155	154	205	48	44		
Pneumonia, primary			323	13				408	10			
Deaths		20		21	23		34		66	26		
Polio-encephalitis, acute	1	—				3	—					
Deaths		—					—					
Poliomyelitis, acute	6	—	1		—	4	—	—		—		
Deaths		—					—					
Puerperal fever	—	—	16	—	1	43	9	13	3	—		
Deaths		1†					1†					
Puerperal pyrexia	191	31	19		—	168	15	29		—		
Deaths												
Relapsing fever	—	—	—		—	—	—	—		—		
Deaths												
Scarlet fever	2,431	167	556	93	84	1,414	142	314	73	53	2,312	260
Deaths	10	—	1	2	—	5	1	1	2	1		
Small-pox	—	—	—		—	—	—	—		—		
Deaths	—	—		—	—	—	—		—	—		
Typhus fever	—	—	—	—	—	—	—	—	—	—		
Deaths	—	—		—	—	—	—		—	—		
Whooping-cough			46		9			603		9		
Deaths	16	2	1	1	—	27	8	28	4	1		
Deaths (0-1 year)	408	82	91	41	41	449	70	96	38	38		
Infant mortality rate (per 1,000 live births)	69	67				72	58					
Deaths (excluding stillbirths)	5,263	1,074	799	228	197	7,457	1,341	1,206	387	273		
Annual death rate (per 1,000 persons living)	13.0	13.5	14.8	15.4	17.5	18.6	16.7	22.9	26.4	26.1		
Live births	6,365	1,246	884	335	232	5,626	1,105	951	296	208		
Annual rate per 1,000 persons living	15.7	15.7	18.0	22.6	20.6	14.0	13.8	19.5	20.2	19.9		
Stillbirths	286	49				257	35					
Rate per 1,000 total births (including stillborn)	43	38				44	31					

(i) 122 great towns in 1937.
(ii) 12 " " "
(iii) 9 " "

* 728 cases in Belfast alone.
† Deaths from puerperal sepsis.

‡ Includes primary form in figures for England and Wales, London (administrative county), and Northern Ireland.

EPIDEMIOLOGICAL NOTES

Enteric Fever

There have been no fresh cases of typhoid fever in Croydon during the last week, and the number of deaths remains at 43—that is, there have been no additional deaths since the 2 recorded in the previous week. Of the 8 cases of enteric fever notified in London 3 were in the borough of Stepney, 2 in Hampstead, and 1 in Wandsworth, while the remaining 2 cases were of paratyphoid fever, one in the City of Westminster and the other in the borough of St. Marylebone. To the 14 notified cases of typhoid fever mentioned last week in Somerset 21 more have been added, while the deaths remain at 3. The cases have been limited to the Highbridge and Bridgwater areas, but Bridgwater itself has not been involved. As a precautionary measure the Highbridge elementary schools and the secondary schools in Bridgwater have been closed. The source of the infection is not known. Two cases of typhoid fever were notified at Plymouth this week. Twenty-eight new cases of typhoid fever in Pembrokeshire have brought the total to 38 at the time of going to press; to date there have been 3 deaths. During the last three months there have been 21 cases of paratyphoid in Northumberland compared with 2 in the preceding quarter. While the majority of cases have been reported in Newcastle—5 fresh cases were reported last week—the disease has cropped up in several other parts of the county. The appearance of enteric fever in these localities has increased the notifications for England and Wales as a whole: the figure for the week ending January 29 being 61, compared with 19 in the previous week and 53 in the corresponding week last year. In London the number during the week has increased from 4 to 8.

Diphtheria and Scarlet Fever

The incidence of diphtheria continues to rise in England and Wales, the notifications being 1,892 for the week under review, compared with 1,737 in the previous week and 1,241 in the corresponding week last year; the median value for the last nine years is 1,400. London has shared in the increase, the notifications for the week being 200, compared with 179 in the previous week and 129 in the corresponding week last year. On the other hand, in Scotland the notifications have dropped from 252 to 245, but still remain higher than the figure of 217 for last year; and in Eire and Northern Ireland small increases have been recorded during the week under review. On the other hand, scarlet fever has shown a decided drop in England and Wales—2,431 against 2,459 in the previous week—but the figure is higher than that of 1,414 in 1936 and somewhat greater than the median value—2,312—for the last nine years.

Measles

As measles is only notifiable in the boroughs of Shoreditch, Stepney, Bermondsey, and the Port of London exact figures of its incidence in London are not available. An advance in the present epidemic is suggested by an increase of notifications from 17 to 23 during the week. Confirmatory evidence is furnished by the numbers of measles cases reported among the children of the L.C.C. elementary schools—784 cases compared with 522 in the previous week—and by the average daily admissions to the L.C.C. fever hospitals, which have risen from 25 to 32. The London deaths numbered 2 against 3 in the previous week, while for England and Wales the measles deaths have dropped from 48 to 37. In Scotland notifications of measles have risen from 1,544 to 1,661, and the deaths from 14 to 17. In Glasgow the numbers notified during the week have fallen from 1,077 to 1,013, and in Edinburgh from 214 to 172; but in Dundee the numbers have risen from 141 to 338, and small outbreaks have occurred in various localities. In Belfast measles notifications have fallen from 832 to 728, but the deaths for the week have increased from 15 to 22.

Medical News

A meeting of the Chelsea Clinical Society will be held at the Hotel Rembrandt, Thurloe Place, S.W., on Tuesday, February 15, at 8.30 p.m., when Dr. Charles F. White, medical officer of health for the City of London, will open a discussion on "Quarantine, Past, Present, and Future." The meeting will be preceded by dinner at 7.30 p.m.

A meeting of the Society of Medical Officers of Health will be held at 1, Thornhaugh Street, Russell Square, W.C., on Friday, February 18, at 5 p.m., when Dr. Hugh Paul will open a discussion on "Present Practice in Regard to Quarantine and Disinfection." The Maternity and Child Welfare Group of the Society will meet at 1, Thornhaugh Street, W.C., on Friday, February 25, at 5.30 p.m., when Dr. Ethel Cassie will read a paper on "Children Living Apart from their Parents, including the 'Daily Minded.'"

The Hunterian Society has arranged a banquet to commemorate the 210th anniversary of the birth of John Hunter to be held at the May Fair Hotel, Berkeley Street, W., on Thursday, February 17, at 7.15 for 7.30 p.m. The price of the dinner will be 12s. 6d. (exclusive of wines), and will be collected at the table. The Lord Mayor of London and other distinguished guests will be present.

A joint meeting of the Royal Sanitary Institute and the Yorkshire Branch of the Society of Medical Officers of Health will be held at Dewsbury Town Hall on Friday, February 11, at 5.30 p.m., when discussions will take place on "The Laboratory Examination of Milk," to be opened by Dr. P. L. Sutherland, and on "The Maternity Services," to be opened by Dr. J. F. Galloway.

The British Institute of Philosophy announces an address entitled "Philosophy and the Common Reader," by Professor L. S. Stebbing, on Tuesday, February 15, at 8.15 p.m., at University College, Gower Street. Cards of admission can be had from the Director of Studies, University Hall, 14, Gordon Square, W.C.1.

The next quarterly meeting of the Royal Medico-Psychological Association will be held at 11, Chandos Street, W., on Thursday, February 17, at 2.30 p.m., under the presidency of Dr. Douglas McRae. Dr. S. Sharman will read a paper on "Some Observations on the Theory of Perception."

Sir Walter Langdon-Brown will deliver the second Skinner Lecture on "The Pursuit of Shadows" before the British Association of Radiologists, 32, Welbeck Street, W., on Friday, February 18, at 4 p.m. All members of the medical profession are invited to attend.

On Friday, February 18, at 4 p.m., at the Royal Army Medical College Library, Millbank, Lady Keogh will present the Banner of a Knight Grand Cross of the Order of the Bath, bequeathed to the College by the late Lieutenant-General Sir Alfred Keogh.

A congress of cosmobiology will be held at Nice in April. Further information can be obtained from Dr. Maurice Faure, 24, Rue Verdi, Nice.

There is a certain amount of time available for the treatment at University College Hospital of cases of malignant disease, other than patients of the hospital, with the two-gramme mass unit of radium. It is particularly suitable for the irradiation of superficial carcinoma, growths of the mouth and pharynx, and glandular fields. Applications for the treatment of patients should be sent to the Harker Smith Registrar, University College Hospital, London, W.C.1.

The Medical Research Council has been entrusted with an annuity of £350 for a period of twenty-five years, provided by the late Mr. Eugen M. Schlesinger and by Mrs. Schlesinger to establish a memorial to their daughter in the form of a Kathleen Schlesinger Research Fellowship. This is to be given for investigations on the subject of cysts of the brain or allied conditions, and will ordinarily be tenable at the National Hospital for Diseases of the Nervous System, Queen Square, London, for periods of from one to three years. Awards will be made by the Council with the assistance of a special advisory committee appointed in terms of the trust deed.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, W.C.1.

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QUERIES AND ANSWERS

"Cracking Skin"

Dr. F. ARTHUR HEPWORTH (Saffron Walden), in reply to Dr. A. E. Moore's question in the *Journal* of January 29 (p. 264), writes: Cracking of the skin of the hands and feet is usually associated with dryness of the skin all over the body; it is present from early childhood, and probably inherited. The hands should be treated with glycerin (2 parts) and water (1 part) after washing. Pure glycerin is unsatisfactory and lotions made with mucilage are useless. The diluted glycerin is rubbed on the skin when half dried, paying special attention to finger joints and tips, and then drying is completed with a dry towel. Use superfatted soap, dry the hands very carefully, and don't wash more often than is necessary. Always wear gloves in winter, or at any time when north or east winds are about. For cracked heels rub in an ointment containing a little zinc oxide and bismuth every morning and evening, the best time being after a hot bath. A few days' treatment is usually enough. The ointment should be made with animal or vegetable fatty base, *not* soft paraffin. Another useful application for hands and feet is "camphor-ball" (Martindale's *Extra Pharmacopoeia*, p. 314). For deep painful cracks on the fingers an old-fashioned treatment is to drop melted cobblers' wax into each crack and cover with a small piece of paper or linen before it sets, in order to prevent the wax sticking to articles handled and to hide the unsightly blob of wax. This is the only remedy I know which stops the pain at once and really heals the crack. I have recently met with a severe case of cracked hands appearing as a new condition in adult life and not associated with dry skin elsewhere. This has almost recovered under treatment by ultra-violet light and application of linimentum calaminae. I believe this to be an occupational dermatitis.

Treatment of Ascites

"PERPLEXED" writes: I should like suggestions from readers with similar experience as to the best treatment for the following troublesome case of ascites. An elderly lady, a widow aged 70 with four children, who had a long alcoholic history, noticed a swelling of the abdomen about one year ago. She was first examined in June, 1937, and paracentesis was performed in July. From the end of August tappings have had to be done every week, amounts of from 7 to 11 or 12 pints being withdrawn each time. The fluid is straw-coloured, usually clear, but sometimes a little milky, and examination shows an excess of endothelial cells. Pathologists report that the condition might be either neoplastic or due to a cirrhotic liver. The patient feels very well, apart from the swelling of the stomach, and gets about her house doing light work. The pulse rate is 80, occasionally there is slight oedema of the feet and some altered blood in the motions, but the general aspect does not suggest malignant disease. *X*-ray examination of the colon and a straight *x*-ray were negative, as was the Wassermann test. Thirty years ago she had an operation for simple ovarian cyst. On examination of the abdomen after paracentesis the edge of the liver is felt to be very hard and shrunken to the xiphisternum. There is also a small mass, possibly enlarged glands, in the right iliac fossa. I should like to know of any alternative methods of treatment in order to avoid frequent tappings. Treatment with purgation, salyrgan, diuretics, and antiphlogistine has been tried without effect.

Fomites

"SENEX" writes from Kent: Apropos of Professor Miles Phillips's article on the history of the prevention of puerperal fever (*Journal*, January 1) the word "fomites" seems to be wrongly used: "The actual fomites were the micro-organisms of Leeuwenhoek." My dictionary gives "Fomes (pl. fomites), a substance capable of retaining contagious germs . . . as woollen garments and bedclothing." Is there any authority for Professor Phillips's use of the word?

*** In medical usage "fomes" (Latin for tinder, kindling-wood, or touch-wood) means any substance other than food capable of acting as the medium for transmitting or harbouring contagion; it is usually employed in the plural.

LETTERS, NOTES, ETC.

Rehabilitation After Injuries

Dame GEORGINA BULLER, chairman of the Training Committee of the Cripples' Training College, Leatherhead Court, Surrey, writes: My attention has recently been called to a review which appeared in your *Journal* for January 22 of the recently published *Handbook on the Welfare of Cripples*. In this article the writer states that: "At present, while the treatment of injuries, restoration of function, and vocational training are provided to some extent at centres in different parts of England, there is still no provision for reconditioning, except at the small centre established by the L.M.S. Railway at Crewe." May I point out that this statement is not quite accurate having regard to the reconditioning work which is undertaken at this College. I enclose herewith a copy of the syllabus, and a reference to the rehabilitation course on pages 3 and 7 will show that activities are by no means limited solely to vocational training. On the contrary, provision for reconditioning has been an important element of the College work since it was opened in 1934, and the Training Committee are of opinion that such provision will always be more satisfactorily made in a place where vocational training is also carried on. It is by using the facilities available in connexion with the latter that remedial work of a varied nature is made available in those cases where reconditioning only is required.

Law and Theories of Evolution

Dr. H. WILFRED EDDISON (Exeter) writes: There has recently been a considerable amount of discussion on the validity or otherwise of the law of evolution, and many examples of muddled thinking have arisen. One is seen in the confusion between the law of evolution, on the one hand, and theories of evolution put forward, on the other, to account for its physical mechanism, none of which is completely adequate. The law of evolution and the theories of evolution are not synonymous terms. Even greater confusion is shown in the failure to distinguish between form and content, a distinction which Eddington is always so careful to make clear. The law of evolution is concerned solely with the form that mind has taken in the course of its development through the ages. The content of evolution, what mind really is, is not a subject for the scientist. Yet only too often we hear criticisms of the law of evolution on the ground that it is hostile to a religious belief in the content of what is evolved. To criticize in terms of content a law which relates only to form does not seem to make sense. Science, being confined to form, has nothing to say regarding content. Yet how many people fail to realize that the scientist freely admits this! The Church, by its recent definition of its attitude towards the law of evolution, has shown its comprehension of this point, yet it has drawn upon itself adverse criticism based upon the two points of confusion referred to.